# APPENDIX 250S-B

# CONSTRUCTION COST ESTIMATES

Cost Calculations for Project: **Soos Alt 3A**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Project Year: 2002

Comments: NOTE: February 2002 Seattle ENR CCI = 7560.74

Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| Pump Station B | Pump Station | 2002 | 3,030,000 | 1.00 | 3,030,000 |
| FM B | Pipe | 2002 | 1,530,000 | 1.00 | 1,530,000 |
| PS B GS 12" | Pipe | 2002 | 780,000 | 1.00 | 780,000 |
| PS B GS 18" | Pipe | 2002 | 552,000 | 1.00 | 552,000 |
| Pump Station D | Pump Station | 2002 | 7,140,000 | 1.00 | 7,140,000 |
| FM D | Pipe | 2002 | 7,850,000 | 1.00 | 7,850,000 |
| 24" gs psd | Pipe | 2002 | 699,000 | 1.00 | 699,000 |
| 36" gs psd | Pipe | 2002 | 3,060,000 | 1.00 | 3,060,000 |
| Pump Station H | Pump Station | 2002 | 2,400,000 | 1.00 | 2,400,000 |
| FM H | Pipe | 2002 | 282,000 | 1.00 | 282,000 |
| PS F | Pump Station | 2002 | 5,520,000 | 1.00 | 5,520,000 |
| FM F | Pipe | 2002 | 5,410,000 | 1.00 | 5,410,000 |
| PS C | Pump Station | 2002 | 5,000,000 | 1.00 | 5,000,000 |
| Black Diamond GS | Project | 2002 | 0 | 1.00 | 0 |
| Diverted Section Power Lines (w/ 3 subs) | Project | 2002 | 19,700,000 | 1.00 | 19,700,000 |
| Diverted Section SR516 (w/ 3 subs) | Project | 2002 | 24,000,000 | 1.00 | 24,000,000 |

| | | | | | |
|---|---|---|---|---|---|
| SR18 w/LS11 (open cut) | Project | 2001 | 0 | 1.03 | 0 |
| 42" | Pipe | 2002 | 3,850,000 | 1.00 | 3,850,000 |
| 30" | Pipe | 2002 | 2,640,000 | 1.00 | 2,640,000 |
| BD Parallel Section 3A(1)/3A(1A)/3A(2) | Project | 2002 | 0 | 1.00 | 0 |
| 21" (w/ 20 subs) | Project | 2002 | 14,400,000 | 1.00 | 14,400,000 |
| 18" (w/ 6 subs) | Project | 2002 | 3,210,000 | 1.00 | 3,210,000 |
| 15" (with 1 sub) | Project | 2002 | 386,000 | 1.00 | 386,000 |
| 12" (w/ 2 subs) | Project | 2002 | 146,000 | 1.00 | 146,000 |
| 10" (w/ 2 subs) | Project | 2002 | 137,000 | 1.00 | 137,000 |
| LS 11 | Pump Station | 2002 | 3,810,000 | 1.00 | 3,810,000 |
| FM LS11 | Pipe | 2002 | 940,000 | 1.00 | 940,000 |
| SR18 w/o LS11 Microtunnel | Project | 2001 | 0 | 1.03 | 0 |
| 24" | Pipe | 2002 | 394,000 | 1.00 | 394,000 |
| Microtunnel SR18 | Microtunnel | 2002 | 8,230,000 | 1.00 | 8,230,000 |
| 42" | Pipe | 2002 | 1,590,000 | 1.00 | 1,590,000 |
| 27 | Pipe | 2002 | 899,000 | 1.00 | 899,000 |
| | | | | Subtotal | 128,000,000 |

Total: $128,000,000

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## Cost Calculations for Pump Station: **Pump Station B**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ). Unless added as an Additional Costs item in the estimate, this cost does NOT include land acquisition costs.*

### Assumptions

Construction Year: 2002

Firm Capacity: 5 mgd

Total Dynamic Head: 171 ft

Excavation Depth: 30 ft

Calculated Parameters

| | | |
|---|---|---|
| Required Pump Power | 294 | Hp |
| Base Architectural/Structural Unit Cost | 197,000 | $/mgd |
| Architectural/Structural Unit Cost Adjustment | 850 | $/mgd |
| Base Mechanical Unit Cost | 165,000 | $/mgd |
| Mechanical Unit Cost Adjustment | 21,300 | $/mgd |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Site/Civil | 1 | LS | 185,000 | 185,000 |
| Electrical/Instrumentation | 1 | LS | 755,000 | 755,000 |
| Architectural/Structural | 5 | mgd | 198,000 | 990,000 |
| Mechanical | 5 | mgd | 186,000 | 930,000 |
| | | Year 1999 subtotal | | 2,860,000 |

| | |
|---|---|
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.06 |
| Subtotal | 3,030,000 |

Total: $3,030,000

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## Cost Calculations for Pipe: **FM B**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002

Length: 5426 ft

Conduit Type: Force Main
Depth of Cover: 6 ft
Trench Backfill Type: Imported
Manhole Spacing: None
Existing Utilities: Average
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 12 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.1 | ft |
| Trench Width | 3.93 | ft |
| Excavation Depth | 8.1 | ft |
| Complete Surface Rest. Width | 5.93 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 6,397 | CY | 10.00 | 64,000 |
| Backfill | 3,949 | CY | 25.00 | 98,700 |
| Complete Pavement Restoration | 3,575 | SY | 50.00 | 179,000 |
| Overlay Pavement Restoration | 9,688 | SY | 20.00 | 194,000 |
| Trench Safety | 87,901 | SF | 0.50 | 44,000 |
| Spoil Load and Haul | 6,397 | CY | 10.00 | 64,000 |
| Pipe Unit Material Cost | 5,426 | lf | 18.00 | 97,700 |
| Pipe Installation | 5,426 | lf | 15.00 | 81,400 |
| Place Pipe Zone Fill | 2,257 | CY | 25.00 | 56,400 |
| Existing Utilities | 5,426 | lf | 20.00 | 109,000 |
| Dewatering | 5,426 | lf | 50.00 | 271,000 |
| Traffic Control | 5,426 | lf | 10.00 | 54,300 |
| | | | Year 1999 subtotal | 1,310,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 1,530,000 |

Total: $1,530,000

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## Cost Calculations for Pipe: **PS B GS 12"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 2538 ft
Conduit Type: Gravity Sewer
Depth of Cover: 7 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Average
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 12 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.42 | ft |
| Trench Width | 4.35 | ft |
| Excavation Depth | 9.42 | ft |
| Complete Surface Rest. Width | 6.35 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 3,852 | CY | 10.00 | 38,500 |
| Backfill | 2,453 | CY | 25.00 | 61,300 |
| Complete Pavement Restoration | 1,791 | SY | 50.00 | 89,600 |
| Overlay Pavement Restoration | 4,413 | SY | 20.00 | 88,300 |
| Trench Safety | 47,816 | SF | 0.50 | 23,900 |
| Spoil Load and Haul | 3,852 | CY | 10.00 | 38,500 |
| Pipe Unit Material Cost | 2,538 | lf | 15.00 | 38,100 |
| Pipe Installation | 2,538 | lf | 15.00 | 38,100 |
| Place Pipe Zone Fill | 1,250 | CY | 25.00 | 31,300 |
| Manholes | 6 | MH | 3,000.00 | 18,000 |
| Existing Utilities | 2,538 | lf | 20.00 | 50,800 |
| Dewatering | 2,538 | lf | 50.00 | 127,000 |
| Traffic Control | 2,538 | lf | 10.00 | 25,400 |
| | | | Year 1999 subtotal | 669,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 780,000 |

Total: $780,000

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## Cost Calculations for Pipe: **PS B GS 18"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 1636 ft
Conduit Type: Gravity Sewer
Depth of Cover: 4 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Average
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 6.92 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 2,097 | CY | 10.00 | 21,000 |
| Backfill | 909 | CY | 25.00 | 22,700 |
| Complete Pavement Restoration | 1,272 | SY | 50.00 | 63,600 |
| Overlay Pavement Restoration | 2,727 | SY | 20.00 | 54,500 |
| Trench Safety | 22,642 | SF | 0.50 | 11,300 |
| Spoil Load and Haul | 2,097 | CY | 10.00 | 21,000 |

| | | | | |
|---|---|---|---|---|
| Pipe Unit Material Cost | 1,636 | lf | 23.00 | 37,600 |
| Pipe Installation | 1,636 | lf | 25.00 | 40,900 |
| Place Pipe Zone Fill | 1,012 | CY | 25.00 | 25,300 |
| Manholes | 4 | MH | 3,000.00 | 12,000 |
| Existing Utilities | 1,636 | lf | 30.00 | 49,100 |
| Dewatering | 1,636 | lf | 60.00 | 98,200 |
| Traffic Control | 1,636 | lf | 10.00 | 16,400 |
| | | | Year 1999 subtotal | 474,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 552,000 |

Total: $552,000

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## Cost Calculations for Pump Station: **Pump Station D**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ). Unless added as an Additional Costs item in the estimate, this cost does NOT include land acquisition costs.*

### Assumptions

Construction Year: 2002
Firm Capacity: 19.6 mgd
Total Dynamic Head: 163 ft
Excavation Depth: 30 ft

### Calculated Parameters

| | | |
|---|---|---|
| Required Pump Power | 1,100 | Hp |

| | | |
|---|---|---|
| Base Architectural/Structural Unit Cost | 104,000 | $/mgd |
| Architectural/Structural Unit Cost Adjustment | 717 | $/mgd |
| Base Mechanical Unit Cost | 91,800 | $/mgd |
| Mechanical Unit Cost Adjustment | 17,900 | $/mgd |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Site/Civil | 1 | LS | 477,000 | 477,000 |
| Electrical/Instrumentation | 1 | LS | 1,960,000 | 1,960,000 |
| Architectural/Structural | 20 | mgd | 105,000 | 2,100,000 |
| Mechanical | 20 | mgd | 110,000 | 2,200,000 |
| | | Year 1999 subtotal | | 6,740,000 |

| | |
|---|---|
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.06 |
| Subtotal | 7,140,000 |

Total: $7,140,000

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## Cost Calculations for Pipe: **FM D**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 16200 ft
Conduit Type: Force Main
Depth of Cover: 6 ft
Trench Backfill Type: Imported

Manhole Spacing: None
Existing Utilities: Average
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Light
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 30 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.67 | ft |
| Trench Width | 5.97 | ft |
| Excavation Depth | 9.67 | ft |
| Complete Surface Rest. Width | 7.97 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 34,638 | CY | 10.00 | 346,000 |
| Backfill | 17,910 | CY | 25.00 | 448,000 |
| Complete Pavement Restoration | 14,346 | SY | 50.00 | 717,000 |
| Overlay Pavement Restoration | 25,254 | SY | 20.00 | 505,000 |
| Trench Safety | 313,308 | SF | 0.50 | 157,000 |
| Spoil Load and Haul | 34,638 | CY | 10.00 | 346,000 |
| Pipe Unit Material Cost | 16,200 | lf | 80.00 | 1,300,000 |
| Pipe Installation | 16,200 | lf | 40.00 | 648,000 |
| Place Pipe Zone Fill | 13,369 | CY | 25.00 | 334,000 |
| Existing Utilities | 16,200 | lf | 40.00 | 648,000 |
| Dewatering | 16,200 | lf | 70.00 | 1,130,000 |
| Traffic Control | 16,200 | lf | 10.00 | 162,000 |
| | | | Year 1999 subtotal | 6,740,000 |

Mobilization/Demobilization at 10% 1.10

| | |
|---|---|
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 7,850,000 |

Total: $7,850,000

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## Cost Calculations for Pipe: **24" gs psd**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1200 ft
Conduit Type: Gravity Sewer
Depth of Cover: 14 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 24 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.5 | ft |
| Trench Width | 5.75 | ft |
| Excavation Depth | 17.5 | ft |

Complete Surface Rest. Width 7.75 ft

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,472 | CY | 10.00 | 44,700 |
| Backfill | 3,322 | CY | 25.00 | 83,100 |
| Complete Pavement Restoration | 1,033 | SY | 50.00 | 51,700 |
| Overlay Pavement Restoration | 1,900 | SY | 20.00 | 38,000 |
| Trench Safety | 42,000 | SF | 0.50 | 21,000 |
| Spoil Load and Haul | 4,472 | CY | 10.00 | 44,700 |
| Pipe Unit Material Cost | 1,200 | lf | 30.00 | 36,000 |
| Pipe Installation | 1,200 | lf | 30.00 | 36,000 |
| Place Pipe Zone Fill | 932 | CY | 25.00 | 23,300 |
| Manholes | 3 | MH | 5,600.00 | 16,800 |
| Existing Utilities | 1,200 | lf | 80.00 | 96,000 |
| Dewatering | 1,200 | lf | 70.00 | 84,000 |
| Traffic Control | 1,200 | lf | 20.00 | 24,000 |
| | | | Year 1999 subtotal | 599,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 699,000 |

Total: $699,000

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## Cost Calculations for Pipe: **36" gs psd**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 4130 ft
Conduit Type: Gravity Sewer
Depth of Cover: 13 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 36 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 3.67 | ft |
| Trench Width | 7.27 | ft |
| Excavation Depth | 17.7 | ft |
| Complete Surface Rest. Width | 9.27 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 19,683 | CY | 10.00 | 197,000 |
| Backfill | 13,344 | CY | 25.00 | 334,000 |
| Complete Pavement Restoration | 4,254 | SY | 50.00 | 213,000 |
| Overlay Pavement Restoration | 5,842 | SY | 20.00 | 117,000 |
| Trench Safety | 146,202 | SF | 0.50 | 73,100 |
| Spoil Load and Haul | 19,650 | CY | 10.00 | 197,000 |
| Pipe Unit Material Cost | 4,130 | lf | 60.00 | 248,000 |
| Pipe Installation | 4,130 | lf | 54.00 | 223,000 |
| Place Pipe Zone Fill | 4,687 | CY | 25.00 | 117,000 |
| Manholes | 9 | MH | 9,500.00 | 85,500 |

| | | | | |
|---|---|---|---|---|
| Existing Utilities | 4,130 | lf | 100.00 | 413,000 |
| Dewatering | 4,130 | lf | 80.00 | 330,000 |
| Traffic Control | 4,130 | lf | 20.00 | 82,600 |
| | | | Year 1999 subtotal | 2,630,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 3,060,000 |

Total: $3,060,000

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## Cost Calculations for Pump Station: **Pump Station H**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ). Unless added as an Additional Costs item in the estimate, this cost does NOT include land acquisition costs.*

### Assumptions

Construction Year: 2002
Firm Capacity: 5.3 mgd
Total Dynamic Head: 51 ft
Excavation Depth: 30 ft

### Calculated Parameters

| | | |
|---|---|---|
| Required Pump Power | 93 | Hp |
| Base Architectural/Structural Unit Cost | 192,000 | $/mgd |
| Architectural/Structural Unit Cost Adjustment | -1,150 | $/mgd |
| Base Mechanical Unit Cost | 161,000 | $/mgd |
| Mechanical Unit Cost Adjustment | -28,800 | $/mgd |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Site/Civil | 1 | LS | 191,000 | 191,000 |
| Electrical/Instrumentation | 1 | LS | 454,000 | 454,000 |
| Architectural/Structural | 5 | mgd | 191,000 | 955,000 |
| Mechanical | 5 | mgd | 132,000 | 660,000 |
| | | Year 1999 subtotal | | 2,260,000 |

| | |
|---|---|
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.06 |
| Subtotal | 2,400,000 |

Total: $2,400,000

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## Cost Calculations for Pipe: **FM H**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 1000 ft
Conduit Type: Force Main
Depth of Cover: 6 ft
Trench Backfill Type: Imported
Manhole Spacing: None
Existing Utilities: Average
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)

Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 12 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.1 | ft |
| Trench Width | 3.93 | ft |
| Excavation Depth | 8.1 | ft |
| Complete Surface Rest. Width | 5.93 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 1,179 | CY | 10.00 | 11,800 |
| Backfill | 728 | CY | 25.00 | 18,200 |
| Complete Pavement Restoration | 659 | SY | 50.00 | 33,000 |
| Overlay Pavement Restoration | 1,786 | SY | 20.00 | 35,700 |
| Trench Safety | 16,200 | SF | 0.50 | 8,100 |
| Spoil Load and Haul | 1,179 | CY | 10.00 | 11,800 |
| Pipe Unit Material Cost | 1,000 | lf | 18.00 | 18,000 |
| Pipe Installation | 1,000 | lf | 15.00 | 15,000 |
| Place Pipe Zone Fill | 416 | CY | 25.00 | 10,400 |
| Existing Utilities | 1,000 | lf | 20.00 | 20,000 |
| Dewatering | 1,000 | lf | 50.00 | 50,000 |
| Traffic Control | 1,000 | lf | 10.00 | 10,000 |
| | | | Year 1999 subtotal | 242,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 282,000 |

Total: $282,000

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## Cost Calculations for Pump Station: **PS F**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ). Unless added as an Additional Costs item in the estimate, this cost does NOT include land acquisition costs.*

### Assumptions

Construction Year: 2002
Firm Capacity: 12.3 mgd
Total Dynamic Head: 200 ft
Excavation Depth: 30 ft

### Calculated Parameters

| | | |
|---|---|---|
| Required Pump Power | 847 | Hp |
| Base Architectural/Structural Unit Cost | 129,000 | $/mgd |
| Architectural/Structural Unit Cost Adjustment | 1,330 | $/mgd |
| Base Mechanical Unit Cost | 112,000 | $/mgd |
| Mechanical Unit Cost Adjustment | 33,300 | $/mgd |

### Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Site/Civil | 1 | LS | 331,000 | 331,000 |
| Electrical/Instrumentation | 1 | LS | 1,580,000 | 1,580,000 |
| Architectural/Structural | 12 | mgd | 130,000 | 1,560,000 |
| Mechanical | 12 | mgd | 145,000 | 1,740,000 |
| | | Year 1999 subtotal | | 5,210,000 |

Multiplier from ENRCCI 7137 (1999) to 7560 (2002) 1.06

| | |
|---|---|
| Effective Multiplier | 1.06 |
| Subtotal | 5,520,000 |

Total: $5,520,000

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## Cost Calculations for Pipe: **FM F**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 14500 ft
Conduit Type: Force Main
Depth of Cover: 6 ft
Trench Backfill Type: Imported
Manhole Spacing: None
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Collector Street (18 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.63 | ft |
| Trench Width | 4.62 | ft |
| Excavation Depth | 8.63 | ft |
| Complete Surface Rest. Width | 6.62 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 21,412 | CY | 10.00 | 214,000 |
| Backfill | 12,406 | CY | 25.00 | 310,000 |
| Complete Pavement Restoration | 10,666 | SY | 50.00 | 533,000 |
| Overlay Pavement Restoration | 18,334 | SY | 20.00 | 367,000 |
| Trench Safety | 250,270 | SF | 0.50 | 125,000 |
| Spoil Load and Haul | 21,412 | CY | 10.00 | 214,000 |
| Pipe Unit Material Cost | 14,500 | lf | 30.00 | 435,000 |
| Pipe Installation | 14,500 | lf | 25.00 | 363,000 |
| Place Pipe Zone Fill | 7,886 | CY | 25.00 | 197,000 |
| Existing Utilities | 14,500 | lf | 60.00 | 870,000 |
| Dewatering | 14,500 | lf | 60.00 | 870,000 |
| Traffic Control | 14,500 | lf | 10.00 | 145,000 |
| | | | Year 1999 subtotal | 4,640,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 5,410,000 |

Total: $5,410,000

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## Cost Calculations for Pump Station: **PS C**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ). Unless added as an Additional Costs item in the estimate, this cost does NOT include land acquisition costs.*

Assumptions

Construction Year: 2002
Firm Capacity: 14.4 mgd
Total Dynamic Head: 119 ft
Excavation Depth: 30 ft

Calculated Parameters

| | | |
|---|---|---|
| Required Pump Power | 590 | Hp |
| Base Architectural/Structural Unit Cost | 120,000 | $/mgd |
| Architectural/Structural Unit Cost Adjustment | -16.7 | $/mgd |
| Base Mechanical Unit Cost | 105,000 | $/mgd |
| Mechanical Unit Cost Adjustment | -417 | $/mgd |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Site/Civil | 1 | LS | 373,000 | 373,000 |
| Electrical/Instrumentation | 1 | LS | 1,200,000 | 1,200,000 |
| Architectural/Structural | 14 | mgd | 120,000 | 1,680,000 |
| Mechanical | 14 | mgd | 105,000 | 1,470,000 |
| | | Year 1999 subtotal | | 4,720,000 |

| | |
|---|---|
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.06 |
| Subtotal | 5,000,000 |

Total: $5,000,000

---

## Cost Calculations for Project: **Black Diamond GS**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Project Year: 2002
Comments:

Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| Diverted Section Power Lines | Project | 2002 | 0 | 1.00 | 0 |
| 30" | Pipe | 2002 | 8,240,000 | 1.00 | 8,240,000 |
| 18" | Pipe | 2002 | 1,310,000 | 1.00 | 1,310,000 |
| BD Parallel Section 3A(3) (w/ 5 subs) | Project | 2002 | 10,100,000 | 1.00 | 10,100,000 |
| Diverted Section SR516 | Project | 2002 | 0 | 1.00 | 0 |
| 30" | Pipe | 2002 | 4,470,000 | 1.00 | 4,470,000 |
| 18" | Pipe | 2002 | 4,220,000 | 1.00 | 4,220,000 |
| BD Parallel Section (3A(4)) (w/ 5 subs) | Project | 2002 | 15,300,000 | 1.00 | 15,300,000 |
| | | | | Subtotal | 43,700,000 |

Total: $43,700,000

---

## Cost Calculations for Project: **Diverted Section Power Lines**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Project Year: 2002
Comments:

Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 30" | Pipe | 2002 | 8,240,000 | 1.00 | 8,240,000 |
| 18" | Pipe | 2002 | 1,310,000 | 1.00 | 1,310,000 |

| | | | | | |
|---|---|---|---|---|---|
| BD Parallel Section 3A(3) | Project | 2002 | 0 | 1.00 | 0 |
| 21" (w/ 20 subs) | Project | 2002 | 7,730,000 | 1.00 | 7,730,000 |
| 18" (w/ 6 subs) | Project | 2002 | 1,990,000 | 1.00 | 1,990,000 |
| 15" (with 1 sub) | Project | 2002 | 386,000 | 1.00 | 386,000 |
| 12" (w/ 2 subs) | Project | 2002 | 0 | 1.00 | 0 |
| 10" (w/ 2 subs) | Project | 2002 | 0 | 1.00 | 0 |
| | | | | Subtotal | 19,700,000 |

Total: $19,700,000

---

## Cost Calculations for Pipe: **30"**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 10296 ft
Conduit Type: Gravity Sewer
Depth of Cover: 15 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Minimal
Pavement Restoration: Trench Width
Traffic: Light
Land Acquisition: None
Required Easements: Residential
Trench Safety: Standard
Pipe Diameter: 30 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 3.08 | ft |
| Trench Width | 6.5 | ft |
| Excavation Depth | 19.1 | ft |
| Complete Surface Rest. Width | 8.5 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 47,343 | CY | 10.00 | 473,000 |
| Backfill | 34,701 | CY | 25.00 | 868,000 |
| Complete Pavement Restoration | 9,724 | SY | 50.00 | 486,000 |
| Trench Safety | 393,307 | SF | 0.50 | 197,000 |
| Easement | 308,880 | SF | 6.60 | 2,040,000 |
| Spoil Load and Haul | 47,293 | CY | 10.00 | 473,000 |
| Pipe Unit Material Cost | 10,296 | lf | 50.00 | 515,000 |
| Pipe Installation | 10,296 | lf | 40.00 | 412,000 |
| Place Pipe Zone Fill | 9,750 | CY | 25.00 | 244,000 |
| Manholes | 21 | MH | 10,500.00 | 221,000 |
| Existing Utilities | 10,296 | lf | 80.00 | 824,000 |
| Dewatering | 10,296 | lf | 20.00 | 206,000 |
| Traffic Control | 10,296 | lf | 10.00 | 103,000 |
| | | | Year 1999 subtotal | 7,060,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 8,240,000 |

Total: $8,240,000

---

## Cost Calculations for Pipe: **18"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 4224 ft
Conduit Type: Gravity Sewer
Depth of Cover: 8 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Average
Dewatering: Minimal
Pavement Restoration: Half Width - Residential Street (14 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 10.9 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 8,526 | CY | 10.00 | 85,300 |
| Backfill | 5,476 | CY | 25.00 | 137,000 |
| Complete Pavement Restoration | 3,285 | SY | 50.00 | 164,000 |
| Overlay Pavement Restoration | 3,285 | SY | 20.00 | 65,700 |
| Trench Safety | 92,083 | SF | 0.50 | 46,000 |
| Spoil Load and Haul | 8,542 | CY | 10.00 | 85,400 |

| | | | | |
|---|---|---|---|---|
| Pipe Unit Material Cost | 4,224 | lf | 23.00 | 97,200 |
| Pipe Installation | 4,224 | lf | 25.00 | 106,000 |
| Place Pipe Zone Fill | 2,613 | CY | 25.00 | 65,300 |
| Manholes | 9 | MH | 3,000.00 | 27,000 |
| Existing Utilities | 4,224 | lf | 30.00 | 127,000 |
| Dewatering | 4,224 | lf | 20.00 | 84,500 |
| Traffic Control | 4,224 | lf | 10.00 | 42,200 |
| | | | Year 1999 subtotal | 1,130,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 1,310,000 |

Total: $1,310,000

---

## Cost Calculations for Project: **BD Parallel Section 3A(3)**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Project Year: 2002

Comments:

### Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 21" | Project | 2002 | 0 | 1.00 | 0 |
| 21" @30' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @28' | Pipe | 2002 | 0 | 1.00 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| 21" @26' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @25' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @24' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @23' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @19' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @17' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @16' | Pipe | 2002 | 607,000 | 1.00 | 607,000 |
| 21" @15' | Pipe | 2002 | 163,000 | 1.00 | 163,000 |
| 21" @13' | Pipe | 2002 | 699,000 | 1.00 | 699,000 |
| 21" @12' | Pipe | 2002 | 230,000 | 1.00 | 230,000 |
| 21" @11' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @10' | Pipe | 2002 | 949,000 | 1.00 | 949,000 |
| 21" @9' | Pipe | 2002 | 866,000 | 1.00 | 866,000 |
| 21" @8' | Pipe | 2002 | 1,330,000 | 1.00 | 1,330,000 |
| 21" @7' | Pipe | 2002 | 241,000 | 1.00 | 241,000 |
| 21" @6' | Pipe | 2002 | 1,040,000 | 1.00 | 1,040,000 |
| 21" @5' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @4' | Pipe | 2002 | 1,600,000 | 1.00 | 1,600,000 |
| 18" | Project | 2002 | 0 | 1.00 | 0 |
| 18" @10' | Pipe | 2002 | 93,600 | 1.00 | 93,600 |
| 18" @9' | Pipe | 2002 | 509,000 | 1.00 | 509,000 |
| 18" @7' | Pipe | 2002 | 201,000 | 1.00 | 201,000 |
| 18" @6' | Pipe | 2002 | 566,000 | 1.00 | 566,000 |
| 18" @5' | Pipe | 2002 | 74,700 | 1.00 | 74,700 |
| 18" @4' | Pipe | 2002 | 543,000 | 1.00 | 543,000 |
| 15" | Project | 2002 | 0 | 1.00 | 0 |
| 15" @11' | Pipe | 2002 | 386,000 | 1.00 | 386,000 |
| 12" | Project | 2002 | 0 | 1.00 | 0 |
| 12" @7' | Pipe | 2002 | 0 | 1.00 | 0 |
| 12" @4' | Pipe | 2002 | 0 | 1.00 | 0 |
| 10" | Project | 2002 | 0 | 1.00 | 0 |
| 10" @7' | Pipe | 2002 | 0 | 1.00 | 0 |
| 10" @4' | Pipe | 2002 | 0 | 1.00 | 0 |
| | | | | Subtotal | 10,100,000 |

Total: $10,100,000

---

## Cost Calculations for Project: **21"**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Project Year: 2002

Comments:

### Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 21" @30' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @28' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @26' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @25' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @24' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @23' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @19' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @17' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @16' | Pipe | 2002 | 607,000 | 1.00 | 607,000 |
| 21" @15' | Pipe | 2002 | 163,000 | 1.00 | 163,000 |
| 21" @13' | Pipe | 2002 | 699,000 | 1.00 | 699,000 |
| 21" @12' | Pipe | 2002 | 230,000 | 1.00 | 230,000 |
| 21" @11' | Pipe | 2002 | 0 | 1.00 | 0 |
| 21" @10' | Pipe | 2002 | 949,000 | 1.00 | 949,000 |
| 21" @9' | Pipe | 2002 | 866,000 | 1.00 | 866,000 |
| 21" @8' | Pipe | 2002 | 1,330,000 | 1.00 | 1,330,000 |
| 21" @7' | Pipe | 2002 | 241,000 | 1.00 | 241,000 |
| 21" @6' | Pipe | 2002 | 1,040,000 | 1.00 | 1,040,000 |
| 21" @5' | Pipe | 2002 | 0 | 1.00 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| 21" @4' | Pipe | 2002 | 1,600,000 | 1.00 | 1,600,000 |
| | | | | Subtotal | 7,730,000 |

Total: $7,730,000

---

## Cost Calculations for Pipe: **21" @30'**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 0 ft
Conduit Type: Gravity Sewer
Depth of Cover: 30 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 33.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Total: $0

---

## Cost Calculations for Pipe: **21" @28'**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 0 ft
Conduit Type: Gravity Sewer
Depth of Cover: 28 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 31.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Total: $0

---

## Cost Calculations for Pipe: **21" @26'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 0 ft
Conduit Type: Gravity Sewer
Depth of Cover: 26 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 29.2 ft |
| Complete Surface Rest. Width | 7.37 ft |

Total: $0

---

## Cost Calculations for Pipe: **21" @25'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT*

*include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 0 ft
Conduit Type: Gravity Sewer
Depth of Cover: 25 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 28.2 ft |
| Complete Surface Rest. Width | 7.37 ft |

Total: $0

---

## Cost Calculations for Pipe: **21" @24'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 0 ft
Conduit Type: Gravity Sewer
Depth of Cover: 24 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 27.2 ft |
| Complete Surface Rest. Width | 7.37 ft |

Total: $0

---

## Cost Calculations for Pipe: **21" @23'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 0 ft
Conduit Type: Gravity Sewer

Depth of Cover: 23 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 26.2 ft |
| Complete Surface Rest. Width | 7.37 ft |

Total: $0

---

## Cost Calculations for Pipe: **21" @19'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 0 ft
Conduit Type: Gravity Sewer
Depth of Cover: 19 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)

Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 22.2 ft |
| Complete Surface Rest. Width | 7.37 ft |

Total: $0

---

## Cost Calculations for Pipe: **21" @17'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 0 ft
Conduit Type: Gravity Sewer
Depth of Cover: 17 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)

Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 20.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Total: $0

---

## Cost Calculations for Pipe: **21" @16'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 1000 ft
Conduit Type: Gravity Sewer
Depth of Cover: 16 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None

Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 19.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 3,819 | CY | 10.00 | 38,200 |
| Backfill | 2,983 | CY | 25.00 | 74,600 |
| Complete Pavement Restoration | 819 | SY | 50.00 | 41,000 |
| Overlay Pavement Restoration | 4,070 | SY | 20.00 | 81,400 |
| Trench Safety | 38,400 | SF | 0.50 | 19,200 |
| Spoil Load and Haul | 3,821 | CY | 10.00 | 38,200 |
| Pipe Unit Material Cost | 1,000 | lf | 26.00 | 26,000 |
| Pipe Installation | 1,000 | lf | 27.00 | 27,000 |
| Place Pipe Zone Fill | 695 | CY | 25.00 | 17,400 |
| Manholes | 2 | MH | 4,000.00 | 8,000 |
| Existing Utilities | 1,000 | lf | 80.00 | 80,000 |
| Dewatering | 1,000 | lf | 60.00 | 60,000 |
| Traffic Control | 1,000 | lf | 10.00 | 10,000 |
| | | | Year 1999 subtotal | 521,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 607,000 |

Total: $607,000

## Cost Calculations for Pipe: **21" @15'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 270 ft
Conduit Type: Gravity Sewer
Depth of Cover: 15 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 18.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

### Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 977 | CY | 10.00 | 9,770 |
| Backfill | 752 | CY | 25.00 | 18,800 |

| | | | | |
|---|---|---|---|---|
| Complete Pavement Restoration | 221 | SY | 50.00 | 11,100 |
| Overlay Pavement Restoration | 1,099 | SY | 20.00 | 22,000 |
| Trench Safety | 9,828 | SF | 0.50 | 4,910 |
| Spoil Load and Haul | 978 | CY | 10.00 | 9,780 |
| Pipe Unit Material Cost | 270 | lf | 26.00 | 7,020 |
| Pipe Installation | 270 | lf | 27.00 | 7,290 |
| Place Pipe Zone Fill | 188 | CY | 25.00 | 4,700 |
| Manholes | 1 | MH | 3,750.00 | 3,750 |
| Existing Utilities | 270 | lf | 80.00 | 21,600 |
| Dewatering | 270 | lf | 60.00 | 16,200 |
| Traffic Control | 270 | lf | 10.00 | 2,700 |
| | | | Year 1999 subtotal | 140,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 163,000 |

Total: $163,000

---

## Cost Calculations for Pipe: **21" @13'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002

Length: 1220 ft

Conduit Type: Gravity Sewer

Depth of Cover: 13 ft

Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 16.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 3,931 | CY | 10.00 | 39,300 |
| Backfill | 2,912 | CY | 25.00 | 72,800 |
| Complete Pavement Restoration | 999 | SY | 50.00 | 50,000 |
| Overlay Pavement Restoration | 4,965 | SY | 20.00 | 99,300 |
| Trench Safety | 39,528 | SF | 0.50 | 19,800 |
| Spoil Load and Haul | 3,933 | CY | 10.00 | 39,300 |
| Pipe Unit Material Cost | 1,220 | lf | 26.00 | 31,700 |
| Pipe Installation | 1,220 | lf | 27.00 | 32,900 |
| Place Pipe Zone Fill | 848 | CY | 25.00 | 21,200 |
| Manholes | 3 | MH | 3,250.00 | 9,750 |
| Existing Utilities | 1,220 | lf | 80.00 | 97,600 |
| Dewatering | 1,220 | lf | 60.00 | 73,200 |
| Traffic Control | 1,220 | lf | 10.00 | 12,200 |
| | | | Year 1999 subtotal | 599,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 699,000 |

Total: $699,000

---

## Cost Calculations for Pipe: **21" @12'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 410 ft
Conduit Type: Gravity Sewer
Depth of Cover: 12 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |

| | | |
|---|---|---|
| Excavation Depth | 15.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 1,239 | CY | 10.00 | 12,400 |
| Backfill | 897 | CY | 25.00 | 22,400 |
| Complete Pavement Restoration | 336 | SY | 50.00 | 16,800 |
| Overlay Pavement Restoration | 1,669 | SY | 20.00 | 33,400 |
| Trench Safety | 12,464 | SF | 0.50 | 6,230 |
| Spoil Load and Haul | 1,240 | CY | 10.00 | 12,400 |
| Pipe Unit Material Cost | 410 | lf | 26.00 | 10,700 |
| Pipe Installation | 410 | lf | 27.00 | 11,100 |
| Place Pipe Zone Fill | 285 | CY | 25.00 | 7,130 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 410 | lf | 80.00 | 32,800 |
| Dewatering | 410 | lf | 60.00 | 24,600 |
| Traffic Control | 410 | lf | 10.00 | 4,100 |
| | | | Year 1999 subtotal | 197,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 230,000 |

Total: $230,000

---

## Cost Calculations for Pipe: **21" @11'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT*

*include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 0 ft
Conduit Type: Gravity Sewer
Depth of Cover: 11 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 14.2 ft |
| Complete Surface Rest. Width | 7.37 ft |

Total: $0

---

## Cost Calculations for Pipe: **21" @10'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 1770 ft
Conduit Type: Gravity Sewer
Depth of Cover: 10 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 13.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,647 | CY | 10.00 | 46,500 |
| Backfill | 3,168 | CY | 25.00 | 79,200 |
| Complete Pavement Restoration | 1,449 | SY | 50.00 | 72,500 |
| Overlay Pavement Restoration | 7,204 | SY | 20.00 | 144,000 |
| Trench Safety | 46,728 | SF | 0.50 | 23,400 |
| Spoil Load and Haul | 4,650 | CY | 10.00 | 46,500 |
| Pipe Unit Material Cost | 1,770 | lf | 26.00 | 46,000 |
| Pipe Installation | 1,770 | lf | 27.00 | 47,800 |
| Place Pipe Zone Fill | 1,231 | CY | 25.00 | 30,800 |
| Manholes | 4 | MH | 3,000.00 | 12,000 |
| Existing Utilities | 1,770 | lf | 80.00 | 142,000 |

| | | | | |
|---|---|---|---|---|
| Dewatering | 1,770 | lf | 60.00 | 106,000 |
| Traffic Control | 1,770 | lf | 10.00 | 17,700 |
| | | | Year 1999 subtotal | 814,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 949,000 |

Total: $949,000

---

## Cost Calculations for Pipe: **21" @9'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1650 ft
Conduit Type: Gravity Sewer
Depth of Cover: 9 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard

Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 12.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,004 | CY | 10.00 | 40,000 |
| Backfill | 2,625 | CY | 25.00 | 65,600 |
| Complete Pavement Restoration | 1,351 | SY | 50.00 | 67,600 |
| Overlay Pavement Restoration | 6,716 | SY | 20.00 | 134,000 |
| Trench Safety | 40,260 | SF | 0.50 | 20,100 |
| Spoil Load and Haul | 4,007 | CY | 10.00 | 40,100 |
| Pipe Unit Material Cost | 1,650 | lf | 26.00 | 42,900 |
| Pipe Installation | 1,650 | lf | 27.00 | 44,600 |
| Place Pipe Zone Fill | 1,147 | CY | 25.00 | 28,700 |
| Manholes | 4 | MH | 3,000.00 | 12,000 |
| Existing Utilities | 1,650 | lf | 80.00 | 132,000 |
| Dewatering | 1,650 | lf | 60.00 | 99,000 |
| Traffic Control | 1,650 | lf | 10.00 | 16,500 |
| | | | Year 1999 subtotal | 743,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 866,000 |

Total: $866,000

## Cost Calculations for Pipe: **21" @8'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 2580 ft
Conduit Type: Gravity Sewer
Depth of Cover: 8 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 11.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

### Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 5,747 | CY | 10.00 | 57,500 |
| Backfill | 3,592 | CY | 25.00 | 89,800 |
| Complete Pavement Restoration | 2,113 | SY | 50.00 | 106,000 |

| | | | | |
|---|---|---|---|---|
| Overlay Pavement Restoration | 10,501 | SY | 20.00 | 210,000 |
| Trench Safety | 57,792 | SF | 0.50 | 28,900 |
| Spoil Load and Haul | 5,752 | CY | 10.00 | 57,500 |
| Pipe Unit Material Cost | 2,580 | lf | 26.00 | 67,100 |
| Pipe Installation | 2,580 | lf | 27.00 | 69,700 |
| Place Pipe Zone Fill | 1,794 | CY | 25.00 | 44,900 |
| Manholes | 6 | MH | 3,000.00 | 18,000 |
| Existing Utilities | 2,580 | lf | 80.00 | 206,000 |
| Dewatering | 2,580 | lf | 60.00 | 155,000 |
| Traffic Control | 2,580 | lf | 10.00 | 25,800 |
| | | | Year 1999 subtotal | 1,140,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 1,330,000 |

Total: $1,330,000

---

## Cost Calculations for Pipe: **21" @7'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002

Length: 480 ft

Conduit Type: Gravity Sewer

Depth of Cover: 7 ft

Trench Backfill Type: Imported

Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 10.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 974 | CY | 10.00 | 9,740 |
| Backfill | 573 | CY | 25.00 | 14,300 |
| Complete Pavement Restoration | 393 | SY | 50.00 | 19,700 |
| Overlay Pavement Restoration | 1,954 | SY | 20.00 | 39,100 |
| Trench Safety | 9,792 | SF | 0.50 | 4,900 |
| Spoil Load and Haul | 975 | CY | 10.00 | 9,750 |
| Pipe Unit Material Cost | 480 | lf | 26.00 | 12,500 |
| Pipe Installation | 480 | lf | 27.00 | 13,000 |
| Place Pipe Zone Fill | 334 | CY | 25.00 | 8,350 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 480 | lf | 80.00 | 38,400 |
| Dewatering | 480 | lf | 60.00 | 28,800 |
| Traffic Control | 480 | lf | 10.00 | 4,800 |
| | | | Year 1999 subtotal | 206,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 241,000 |

Total: $241,000

---

## Cost Calculations for Pipe: **21" @6'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 2130 ft
Conduit Type: Gravity Sewer
Depth of Cover: 6 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |

| | | |
|---|---|---|
| Excavation Depth | 9.21 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 3,902 | CY | 10.00 | 39,000 |
| Backfill | 2,118 | CY | 25.00 | 53,000 |
| Complete Pavement Restoration | 1,744 | SY | 50.00 | 87,200 |
| Overlay Pavement Restoration | 8,669 | SY | 20.00 | 173,000 |
| Trench Safety | 39,235 | SF | 0.50 | 19,600 |
| Spoil Load and Haul | 3,902 | CY | 10.00 | 39,000 |
| Pipe Unit Material Cost | 2,130 | lf | 26.00 | 55,400 |
| Pipe Installation | 2,130 | lf | 27.00 | 57,500 |
| Place Pipe Zone Fill | 1,481 | CY | 25.00 | 37,000 |
| Manholes | 5 | MH | 3,000.00 | 15,000 |
| Existing Utilities | 2,130 | lf | 80.00 | 170,000 |
| Dewatering | 2,130 | lf | 60.00 | 128,000 |
| Traffic Control | 2,130 | lf | 10.00 | 21,300 |
| | | | Year 1999 subtotal | 895,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 1,040,000 |

Total: $1,040,000

---

## Cost Calculations for Pipe: **21" @5'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT*

*include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 0 ft
Conduit Type: Gravity Sewer
Depth of Cover: 5 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 8.21 ft |
| Complete Surface Rest. Width | 7.37 ft |

Total: $0

---

## Cost Calculations for Pipe: **21" @4'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 3425 ft
Conduit Type: Gravity Sewer
Depth of Cover: 4 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 7.21 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,911 | CY | 10.00 | 49,100 |
| Backfill | 2,044 | CY | 25.00 | 51,100 |
| Complete Pavement Restoration | 2,805 | SY | 50.00 | 140,000 |
| Overlay Pavement Restoration | 13,940 | SY | 20.00 | 279,000 |
| Trench Safety | 49,389 | SF | 0.50 | 24,700 |
| Spoil Load and Haul | 4,911 | CY | 10.00 | 49,100 |
| Pipe Unit Material Cost | 3,425 | lf | 26.00 | 89,100 |
| Pipe Installation | 3,425 | lf | 27.00 | 92,500 |
| Place Pipe Zone Fill | 2,381 | CY | 25.00 | 59,500 |
| Manholes | 7 | MH | 3,000.00 | 21,000 |
| Existing Utilities | 3,425 | lf | 80.00 | 274,000 |

| | | | | |
|---|---|---|---|---|
| Dewatering | 3,425 | lf | 60.00 | 206,000 |
| Traffic Control | 3,425 | lf | 10.00 | 34,300 |
| | | | Year 1999 subtotal | 1,370,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 1,600,000 |

Total: $1,600,000

---

## Cost Calculations for Project: **18"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Project Year: 2002

Comments:

### Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 18" @10' | Pipe | 2002 | 93,600 | 1.00 | 93,600 |
| 18" @9' | Pipe | 2002 | 509,000 | 1.00 | 509,000 |
| 18" @7' | Pipe | 2002 | 201,000 | 1.00 | 201,000 |
| 18" @6' | Pipe | 2002 | 566,000 | 1.00 | 566,000 |
| 18" @5' | Pipe | 2002 | 74,700 | 1.00 | 74,700 |
| 18" @4' | Pipe | 2002 | 543,000 | 1.00 | 543,000 |
| | | | | Subtotal | 1,990,000 |

Total: $1,990,000

---

## Cost Calculations for Pipe: **18" @10'**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 210 ft
Conduit Type: Gravity Sewer
Depth of Cover: 10 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 12.9 | ft |
| Complete Surface Rest. Width | 7 | ft |

### Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Excavation | 502 | CY | 10.00 | 5,020 |
| Backfill | 350 | CY | 25.00 | 8,750 |
| Complete Pavement Restoration | 163 | SY | 50.00 | 8,150 |
| Overlay Pavement Restoration | 350 | SY | 20.00 | 7,000 |
| Trench Safety | 5,418 | SF | 0.50 | 2,710 |
| Spoil Load and Haul | 502 | CY | 10.00 | 5,020 |
| Pipe Unit Material Cost | 210 | lf | 23.00 | 4,830 |
| Pipe Installation | 210 | lf | 25.00 | 5,250 |
| Place Pipe Zone Fill | 130 | CY | 25.00 | 3,250 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 210 | lf | 60.00 | 12,600 |
| Dewatering | 210 | lf | 60.00 | 12,600 |
| Traffic Control | 210 | lf | 10.00 | 2,100 |
| | | | Year 1999 subtotal | 80,300 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 93,600 |

Total: $93,600

---

## Cost Calculations for Pipe: **18" @9'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002

Length: 1190 ft

Conduit Type: Gravity Sewer
Depth of Cover: 9 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 11.9 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 2,622 | CY | 10.00 | 26,200 |
| Backfill | 1,763 | CY | 25.00 | 44,100 |
| Complete Pavement Restoration | 926 | SY | 50.00 | 46,300 |
| Overlay Pavement Restoration | 1,983 | SY | 20.00 | 39,700 |
| Trench Safety | 28,322 | SF | 0.50 | 14,200 |
| Spoil Load and Haul | 2,627 | CY | 10.00 | 26,300 |
| Pipe Unit Material Cost | 1,190 | lf | 23.00 | 27,400 |
| Pipe Installation | 1,190 | lf | 25.00 | 29,800 |
| Place Pipe Zone Fill | 736 | CY | 25.00 | 18,400 |
| Manholes | 3 | MH | 3,000.00 | 9,000 |
| Existing Utilities | 1,190 | lf | 60.00 | 71,400 |
| Dewatering | 1,190 | lf | 60.00 | 71,400 |
| Traffic Control | 1,190 | lf | 10.00 | 11,900 |

Year 1999 subtotal 436,000

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 509,000 |

Total: $509,000

---

## Cost Calculations for Pipe: **18" @7'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 500 ft
Conduit Type: Gravity Sewer
Depth of Cover: 7 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 9.92 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 919 | CY | 10.00 | 9,190 |
| Backfill | 556 | CY | 25.00 | 13,900 |
| Complete Pavement Restoration | 389 | SY | 50.00 | 19,500 |
| Overlay Pavement Restoration | 833 | SY | 20.00 | 16,700 |
| Trench Safety | 9,920 | SF | 0.50 | 4,960 |
| Spoil Load and Haul | 919 | CY | 10.00 | 9,190 |
| Pipe Unit Material Cost | 500 | lf | 23.00 | 11,500 |
| Pipe Installation | 500 | lf | 25.00 | 12,500 |
| Place Pipe Zone Fill | 309 | CY | 25.00 | 7,730 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 500 | lf | 60.00 | 30,000 |
| Dewatering | 500 | lf | 60.00 | 30,000 |
| Traffic Control | 500 | lf | 10.00 | 5,000 |
| | | | Year 1999 subtotal | 173,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 201,000 |

Total: $201,000

---

## Cost Calculations for Pipe: **18" @6'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 1440 ft
Conduit Type: Gravity Sewer
Depth of Cover: 6 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 8.92 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 2,379 | CY | 10.00 | 23,800 |
| Backfill | 1,333 | CY | 25.00 | 33,300 |
| Complete Pavement Restoration | 1,120 | SY | 50.00 | 56,000 |
| Overlay Pavement Restoration | 2,400 | SY | 20.00 | 48,000 |

| | | | | |
|---|---|---|---|---|
| Trench Safety | 25,690 | SF | 0.50 | 12,800 |
| Spoil Load and Haul | 2,379 | CY | 10.00 | 23,800 |
| Pipe Unit Material Cost | 1,440 | lf | 23.00 | 33,100 |
| Pipe Installation | 1,440 | lf | 25.00 | 36,000 |
| Place Pipe Zone Fill | 891 | CY | 25.00 | 22,300 |
| Manholes | 3 | MH | 3,000.00 | 9,000 |
| Existing Utilities | 1,440 | lf | 60.00 | 86,400 |
| Dewatering | 1,440 | lf | 60.00 | 86,400 |
| Traffic Control | 1,440 | lf | 10.00 | 14,400 |
| | | | Year 1999 subtotal | 485,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 566,000 |

Total: $566,000

---

## Cost Calculations for Pipe: **18" @5'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 190 ft
Conduit Type: Gravity Sewer
Depth of Cover: 5 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)

Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 7.92 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 279 | CY | 10.00 | 2,790 |
| Backfill | 141 | CY | 25.00 | 3,530 |
| Complete Pavement Restoration | 148 | SY | 50.00 | 7,400 |
| Overlay Pavement Restoration | 317 | SY | 20.00 | 6,340 |
| Trench Safety | 3,010 | SF | 0.50 | 1,510 |
| Spoil Load and Haul | 279 | CY | 10.00 | 2,790 |
| Pipe Unit Material Cost | 190 | lf | 23.00 | 4,370 |
| Pipe Installation | 190 | lf | 25.00 | 4,750 |
| Place Pipe Zone Fill | 118 | CY | 25.00 | 2,950 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 190 | lf | 60.00 | 11,400 |
| Dewatering | 190 | lf | 60.00 | 11,400 |
| Traffic Control | 190 | lf | 10.00 | 1,900 |
| | | | Year 1999 subtotal | 64,100 |

Mobilization/Demobilization at 10% 1.10

| | |
|---|---|
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 74,700 |

Total: $74,700

---

## Cost Calculations for Pipe: **18" @4'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1460 ft
Conduit Type: Gravity Sewer
Depth of Cover: 4 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 6.92 | ft |

Complete Surface Rest. Width 7 ft

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 1,871 | CY | 10.00 | 18,700 |
| Backfill | 811 | CY | 25.00 | 20,300 |
| Complete Pavement Restoration | 1,136 | SY | 50.00 | 56,800 |
| Overlay Pavement Restoration | 2,433 | SY | 20.00 | 48,700 |
| Trench Safety | 20,206 | SF | 0.50 | 10,100 |
| Spoil Load and Haul | 1,871 | CY | 10.00 | 18,700 |
| Pipe Unit Material Cost | 1,460 | lf | 23.00 | 33,600 |
| Pipe Installation | 1,460 | lf | 25.00 | 36,500 |
| Place Pipe Zone Fill | 903 | CY | 25.00 | 22,600 |
| Manholes | 3 | MH | 3,000.00 | 9,000 |
| Existing Utilities | 1,460 | lf | 60.00 | 87,600 |
| Dewatering | 1,460 | lf | 60.00 | 87,600 |
| Traffic Control | 1,460 | lf | 10.00 | 14,600 |
| | | | Year 1999 subtotal | 465,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 543,000 |

Total: $543,000

---

## Cost Calculations for Project: **15"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Project Year: 2002
Comments:

Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 15" @11' | Pipe | 2002 | 386,000 | 1.00 | 386,000 |
| | | | | Subtotal | 386,000 |

Total: $386,000

---

## Cost Calculations for Pipe: **15" @11'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 800 ft
Conduit Type: Gravity Sewer
Depth of Cover: 11 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 15 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.67 | ft |
| Trench Width | 4.67 | ft |
| Excavation Depth | 13.7 | ft |
| Complete Surface Rest. Width | 6.67 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 1,896 | CY | 10.00 | 19,000 |
| Backfill | 1,384 | CY | 25.00 | 34,600 |
| Complete Pavement Restoration | 593 | SY | 50.00 | 29,700 |
| Overlay Pavement Restoration | 3,318 | SY | 20.00 | 66,400 |
| Trench Safety | 21,920 | SF | 0.50 | 11,000 |
| Spoil Load and Haul | 1,892 | CY | 10.00 | 18,900 |
| Pipe Unit Material Cost | 800 | lf | 18.00 | 14,400 |
| Pipe Installation | 800 | lf | 20.00 | 16,000 |
| Place Pipe Zone Fill | 443 | CY | 25.00 | 11,100 |
| Manholes | 2 | MH | 3,000.00 | 6,000 |
| Existing Utilities | 800 | lf | 60.00 | 48,000 |
| Dewatering | 800 | lf | 60.00 | 48,000 |
| Traffic Control | 800 | lf | 10.00 | 8,000 |
| | | | Year 1999 subtotal | 331,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 386,000 |

Total: $386,000

---

Cost Calculations for Project: **12"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Project Year: 2002

Comments:

Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 12" @7' | Pipe | 2002 | 0 | 1.00 | 0 |
| 12" @4' | Pipe | 2002 | 0 | 1.00 | 0 |
| | | | | Subtotal | 0 |

Total: $0

---

## Cost Calculations for Pipe: **12" @7'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002

Length: 0 ft

Conduit Type: Gravity Sewer

Depth of Cover: 7 ft

Trench Backfill Type: Imported

Manhole Spacing: Average (500 ft)

Existing Utilities: Complex

Dewatering: Significant

Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 12 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.42 | ft |
| Trench Width | 4.35 | ft |
| Excavation Depth | 9.42 | ft |
| Complete Surface Rest. Width | 6.35 | ft |

Total: $0

---

## Cost Calculations for Pipe: **12" @4'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 0 ft
Conduit Type: Gravity Sewer
Depth of Cover: 4 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None

Required Easements: None
Trench Safety: Standard
Pipe Diameter: 12 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.42 | ft |
| Trench Width | 4.35 | ft |
| Excavation Depth | 6.42 | ft |
| Complete Surface Rest. Width | 6.35 | ft |

Total: $0

---

## Cost Calculations for Project: **10"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Project Year: 2002
Comments:

Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 10" @7' | Pipe | 2002 | 0 | 1.00 | 0 |
| 10" @4' | Pipe | 2002 | 0 | 1.00 | 0 |
| | | | | Subtotal | 0 |

Total: $0

---

## Cost Calculations for Pipe: **10" @7'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 0 ft
Conduit Type: Gravity Sewer
Depth of Cover: 7 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 10 in.

Geometry

| | |
|---|---|
| Outer Diameter | 1.04 ft |
| Trench Width | 3.85 ft |
| Excavation Depth | 9.04 ft |
| Complete Surface Rest. Width | 5.85 ft |

Total: $0

---

## Cost Calculations for Pipe: **10" @4'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 0 ft
Conduit Type: Gravity Sewer
Depth of Cover: 4 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 10 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.04 | ft |
| Trench Width | 3.85 | ft |
| Excavation Depth | 6.04 | ft |
| Complete Surface Rest. Width | 5.85 | ft |

Total: $0

---

## Cost Calculations for Project: **Diverted Section SR516**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Project Year: 2002

Comments:

Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 30" | Pipe | 2002 | 4,470,000 | 1.00 | 4,470,000 |
| 18" | Pipe | 2002 | 4,220,000 | 1.00 | 4,220,000 |
| BD Parallel Section (3A(4)) | Project | 2002 | 0 | 1.00 | 0 |
| 21" (w/ 20 subs) | Project | 2002 | 12,500,000 | 1.00 | 12,500,000 |
| 18" (w/ 6 subs) | Project | 2002 | 2,180,000 | 1.00 | 2,180,000 |
| 15" (with 1 sub) | Project | 2002 | 386,000 | 1.00 | 386,000 |
| 12" (w/ 2 subs) | Project | 2002 | 146,000 | 1.00 | 146,000 |
| 10" (w/ 2 subs) | Project | 2002 | 137,000 | 1.00 | 137,000 |
| | | | | Subtotal | 24,000,000 |

Total: $24,000,000

---

## Cost Calculations for Pipe: **30"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 8131 ft
Conduit Type: Gravity Sewer
Depth of Cover: 12 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Average
Dewatering: Significant
Pavement Restoration: Half Width - Residential Street (14 ft)
Traffic: Light

Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 30 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 3.08 | ft |
| Trench Width | 6.5 | ft |
| Excavation Depth | 16.1 | ft |
| Complete Surface Rest. Width | 8.5 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 31,515 | CY | 10.00 | 315,000 |
| Backfill | 21,532 | CY | 25.00 | 538,000 |
| Complete Pavement Restoration | 7,679 | SY | 50.00 | 384,000 |
| Overlay Pavement Restoration | 4,969 | SY | 20.00 | 99,400 |
| Trench Safety | 261,818 | SF | 0.50 | 131,000 |
| Spoil Load and Haul | 31,476 | CY | 10.00 | 315,000 |
| Pipe Unit Material Cost | 8,131 | lf | 50.00 | 407,000 |
| Pipe Installation | 8,131 | lf | 40.00 | 325,000 |
| Place Pipe Zone Fill | 7,700 | CY | 25.00 | 193,000 |
| Manholes | 17 | MH | 9,000.00 | 153,000 |
| Existing Utilities | 8,131 | lf | 40.00 | 325,000 |
| Dewatering | 8,131 | lf | 70.00 | 569,000 |
| Traffic Control | 8,131 | lf | 10.00 | 81,300 |
| | | | Year 1999 subtotal | 3,840,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 4,470,000 |

Total: $4,470,000

---

## Cost Calculations for Pipe: **18"**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 12144 ft
Conduit Type: Gravity Sewer
Depth of Cover: 8 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Minimal
Pavement Restoration: Half Width - Residential Street (14 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 10.9 | ft |
| Complete Surface Rest. Width | 7 | ft |

### Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Excavation | 24,513 | CY | 10.00 | 245,000 |
| Backfill | 15,742 | CY | 25.00 | 394,000 |
| Complete Pavement Restoration | 9,445 | SY | 50.00 | 472,000 |
| Overlay Pavement Restoration | 9,445 | SY | 20.00 | 189,000 |
| Trench Safety | 264,739 | SF | 0.50 | 132,000 |
| Spoil Load and Haul | 24,558 | CY | 10.00 | 246,000 |
| Pipe Unit Material Cost | 12,144 | lf | 23.00 | 279,000 |
| Pipe Installation | 12,144 | lf | 25.00 | 304,000 |
| Place Pipe Zone Fill | 7,513 | CY | 25.00 | 188,000 |
| Manholes | 25 | MH | 3,000.00 | 75,000 |
| Existing Utilities | 12,144 | lf | 60.00 | 729,000 |
| Dewatering | 12,144 | lf | 20.00 | 243,000 |
| Traffic Control | 12,144 | lf | 10.00 | 121,000 |
| | | | Year 1999 subtotal | 3,620,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 4,220,000 |

Total: $4,220,000

---

## Cost Calculations for Project: **BD Parallel Section (3A(4))**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Project Year: 2002

Comments:

Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 21" | Project | 2002 | 0 | 1.00 | 0 |
| 21" @30' | Pipe | 2002 | 328,000 | 1.00 | 328,000 |
| 21" @28' | Pipe | 2002 | 517,000 | 1.00 | 517,000 |
| 21" @26' | Pipe | 2002 | 844,000 | 1.00 | 844,000 |
| 21" @25' | Pipe | 2002 | 338,000 | 1.00 | 338,000 |
| 21" @24' | Pipe | 2002 | 512,000 | 1.00 | 512,000 |
| 21" @23' | Pipe | 2002 | 604,000 | 1.00 | 604,000 |
| 21" @19' | Pipe | 2002 | 712,000 | 1.00 | 712,000 |
| 21" @17' | Pipe | 2002 | 286,000 | 1.00 | 286,000 |
| 21" @16' | Pipe | 2002 | 607,000 | 1.00 | 607,000 |
| 21" @15' | Pipe | 2002 | 163,000 | 1.00 | 163,000 |
| 21" @13' | Pipe | 2002 | 699,000 | 1.00 | 699,000 |
| 21" @12' | Pipe | 2002 | 288,000 | 1.00 | 288,000 |
| 21" @11' | Pipe | 2002 | 111,000 | 1.00 | 111,000 |
| 21" @10' | Pipe | 2002 | 949,000 | 1.00 | 949,000 |
| 21" @9' | Pipe | 2002 | 866,000 | 1.00 | 866,000 |
| 21" @8' | Pipe | 2002 | 1,330,000 | 1.00 | 1,330,000 |
| 21" @7' | Pipe | 2002 | 241,000 | 1.00 | 241,000 |
| 21" @6' | Pipe | 2002 | 1,040,000 | 1.00 | 1,040,000 |
| 21" @5' | Pipe | 2002 | 130,000 | 1.00 | 130,000 |
| 21" @4' | Pipe | 2002 | 1,950,000 | 1.00 | 1,950,000 |
| 18" | Project | 2002 | 0 | 1.00 | 0 |
| 18" @10' | Pipe | 2002 | 93,600 | 1.00 | 93,600 |
| 18" @9' | Pipe | 2002 | 509,000 | 1.00 | 509,000 |
| 18" @7' | Pipe | 2002 | 201,000 | 1.00 | 201,000 |
| 18" @6' | Pipe | 2002 | 631,000 | 1.00 | 631,000 |
| 18" @5' | Pipe | 2002 | 206,000 | 1.00 | 206,000 |
| 18" @4' | Pipe | 2002 | 543,000 | 1.00 | 543,000 |
| 15" | Project | 2002 | 0 | 1.00 | 0 |
| 15" @11' | Pipe | 2002 | 386,000 | 1.00 | 386,000 |
| 12" | Project | 2002 | 0 | 1.00 | 0 |
| 12" @7' | Pipe | 2002 | 121,000 | 1.00 | 121,000 |

| | | | | | |
|---|---|---|---|---|---|
| 12" @4' | Pipe | 2002 | 24,500 | 1.00 | 24,500 |
| 10" | Project | 2002 | 0 | 1.00 | 0 |
| 10" @7' | Pipe | 2002 | 114,000 | 1.00 | 114,000 |
| 10" @4' | Pipe | 2002 | 23,400 | 1.00 | 23,400 |
| | | | | Subtotal | 15,300,000 |

Total: $15,300,000

---

## Cost Calculations for Project: **21"**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Project Year: 2002

Comments:

### Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 21" @30' | Pipe | 2002 | 328,000 | 1.00 | 328,000 |
| 21" @28' | Pipe | 2002 | 517,000 | 1.00 | 517,000 |
| 21" @26' | Pipe | 2002 | 844,000 | 1.00 | 844,000 |
| 21" @25' | Pipe | 2002 | 338,000 | 1.00 | 338,000 |
| 21" @24' | Pipe | 2002 | 512,000 | 1.00 | 512,000 |
| 21" @23' | Pipe | 2002 | 604,000 | 1.00 | 604,000 |
| 21" @19' | Pipe | 2002 | 712,000 | 1.00 | 712,000 |
| 21" @17' | Pipe | 2002 | 286,000 | 1.00 | 286,000 |
| 21" @16' | Pipe | 2002 | 607,000 | 1.00 | 607,000 |
| 21" @15' | Pipe | 2002 | 163,000 | 1.00 | 163,000 |
| 21" @13' | Pipe | 2002 | 699,000 | 1.00 | 699,000 |
| 21" @12' | Pipe | 2002 | 288,000 | 1.00 | 288,000 |
| 21" @11' | Pipe | 2002 | 111,000 | 1.00 | 111,000 |

| | | | | | |
|---|---|---|---|---|---|
| 21" @10' | Pipe | 2002 | 949,000 | 1.00 | 949,000 |
| 21" @9' | Pipe | 2002 | 866,000 | 1.00 | 866,000 |
| 21" @8' | Pipe | 2002 | 1,330,000 | 1.00 | 1,330,000 |
| 21" @7' | Pipe | 2002 | 241,000 | 1.00 | 241,000 |
| 21" @6' | Pipe | 2002 | 1,040,000 | 1.00 | 1,040,000 |
| 21" @5' | Pipe | 2002 | 130,000 | 1.00 | 130,000 |
| 21" @4' | Pipe | 2002 | 1,950,000 | 1.00 | 1,950,000 |
| | | | | Subtotal | 12,500,000 |

Total: $12,500,000

---

## Cost Calculations for Pipe: **21" @30'**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 420 ft
Conduit Type: Gravity Sewer
Depth of Cover: 30 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 33.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 2,773 | CY | 10.00 | 27,700 |
| Backfill | 2,422 | CY | 25.00 | 60,600 |
| Complete Pavement Restoration | 344 | SY | 50.00 | 17,200 |
| Overlay Pavement Restoration | 1,709 | SY | 20.00 | 34,200 |
| Trench Safety | 27,888 | SF | 0.50 | 13,900 |
| Spoil Load and Haul | 2,774 | CY | 10.00 | 27,700 |
| Pipe Unit Material Cost | 420 | lf | 26.00 | 10,900 |
| Pipe Installation | 420 | lf | 27.00 | 11,300 |
| Place Pipe Zone Fill | 292 | CY | 25.00 | 7,300 |
| Manholes | 1 | MH | 7,500.00 | 7,500 |
| Existing Utilities | 420 | lf | 80.00 | 33,600 |
| Dewatering | 420 | lf | 60.00 | 25,200 |
| Traffic Control | 420 | lf | 10.00 | 4,200 |
| | | | Year 1999 subtotal | 281,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 328,000 |

Total: $328,000

---

## Cost Calculations for Pipe: **21" @28'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 680 ft
Conduit Type: Gravity Sewer
Depth of Cover: 28 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 31.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,220 | CY | 10.00 | 42,200 |
| Backfill | 3,652 | CY | 25.00 | 91,300 |
| Complete Pavement Restoration | 557 | SY | 50.00 | 27,900 |
| Overlay Pavement Restoration | 2,768 | SY | 20.00 | 55,400 |
| Trench Safety | 42,432 | SF | 0.50 | 21,200 |
| Spoil Load and Haul | 4,221 | CY | 10.00 | 42,200 |

| | | | | |
|---|---|---|---|---|
| Pipe Unit Material Cost | 680 | lf | 26.00 | 17,700 |
| Pipe Installation | 680 | lf | 27.00 | 18,400 |
| Place Pipe Zone Fill | 473 | CY | 25.00 | 11,800 |
| Manholes | 2 | MH | 7,000.00 | 14,000 |
| Existing Utilities | 680 | lf | 80.00 | 54,400 |
| Dewatering | 680 | lf | 60.00 | 40,800 |
| Traffic Control | 680 | lf | 10.00 | 6,800 |
| | | | Year 1999 subtotal | 444,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 517,000 |

Total: $517,000

---

## Cost Calculations for Pipe: **21" @26'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1150 ft
Conduit Type: Gravity Sewer
Depth of Cover: 26 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant

Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 29.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 6,679 | CY | 10.00 | 66,800 |
| Backfill | 5,718 | CY | 25.00 | 143,000 |
| Complete Pavement Restoration | 942 | SY | 50.00 | 47,100 |
| Overlay Pavement Restoration | 4,681 | SY | 20.00 | 93,600 |
| Trench Safety | 67,160 | SF | 0.50 | 33,600 |
| Spoil Load and Haul | 6,681 | CY | 10.00 | 66,800 |
| Pipe Unit Material Cost | 1,150 | lf | 26.00 | 29,900 |
| Pipe Installation | 1,150 | lf | 27.00 | 31,100 |
| Place Pipe Zone Fill | 800 | CY | 25.00 | 20,000 |
| Manholes | 3 | MH | 6,500.00 | 19,500 |
| Existing Utilities | 1,150 | lf | 80.00 | 92,000 |
| Dewatering | 1,150 | lf | 60.00 | 69,000 |
| Traffic Control | 1,150 | lf | 10.00 | 11,500 |
| | | | Year 1999 subtotal | 724,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |

| | |
|---|---|
| Subtotal | 844,000 |

Total: $844,000

---

## Cost Calculations for Pipe: **21" @25'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 470 ft
Conduit Type: Gravity Sewer
Depth of Cover: 25 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 28.2 ft |
| Complete Surface Rest. Width | 7.37 ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 2,636 | CY | 10.00 | 26,400 |
| Backfill | 2,243 | CY | 25.00 | 56,100 |
| Complete Pavement Restoration | 385 | SY | 50.00 | 19,300 |
| Overlay Pavement Restoration | 1,913 | SY | 20.00 | 38,300 |
| Trench Safety | 26,508 | SF | 0.50 | 13,300 |
| Spoil Load and Haul | 2,637 | CY | 10.00 | 26,400 |
| Pipe Unit Material Cost | 470 | lf | 26.00 | 12,200 |
| Pipe Installation | 470 | lf | 27.00 | 12,700 |
| Place Pipe Zone Fill | 327 | CY | 25.00 | 8,180 |
| Manholes | 1 | MH | 6,250.00 | 6,250 |
| Existing Utilities | 470 | lf | 80.00 | 37,600 |
| Dewatering | 470 | lf | 60.00 | 28,200 |
| Traffic Control | 470 | lf | 10.00 | 4,700 |
| | | | Year 1999 subtotal | 290,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 338,000 |

Total: $338,000

---

## Cost Calculations for Pipe: **21" @24'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 720 ft
Conduit Type: Gravity Sewer
Depth of Cover: 24 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 27.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 3,895 | CY | 10.00 | 39,000 |
| Backfill | 3,294 | CY | 25.00 | 82,400 |
| Complete Pavement Restoration | 590 | SY | 50.00 | 29,500 |
| Overlay Pavement Restoration | 2,930 | SY | 20.00 | 58,600 |
| Trench Safety | 39,168 | SF | 0.50 | 19,600 |
| Spoil Load and Haul | 3,896 | CY | 10.00 | 39,000 |
| Pipe Unit Material Cost | 720 | lf | 26.00 | 18,700 |
| Pipe Installation | 720 | lf | 27.00 | 19,400 |
| Place Pipe Zone Fill | 501 | CY | 25.00 | 12,500 |
| Manholes | 2 | MH | 6,000.00 | 12,000 |
| Existing Utilities | 720 | lf | 80.00 | 57,600 |

| | | | | |
|---|---|---|---|---|
| Dewatering | 720 | lf | 60.00 | 43,200 |
| Traffic Control | 720 | lf | 10.00 | 7,200 |
| | | | Year 1999 subtotal | 439,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 512,000 |

Total: $512,000

---

## Cost Calculations for Pipe: **21" @23'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 870 ft
Conduit Type: Gravity Sewer
Depth of Cover: 23 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard

Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 26.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,533 | CY | 10.00 | 45,300 |
| Backfill | 3,807 | CY | 25.00 | 95,200 |
| Complete Pavement Restoration | 712 | SY | 50.00 | 35,600 |
| Overlay Pavement Restoration | 3,541 | SY | 20.00 | 70,800 |
| Trench Safety | 45,588 | SF | 0.50 | 22,800 |
| Spoil Load and Haul | 4,535 | CY | 10.00 | 45,400 |
| Pipe Unit Material Cost | 870 | lf | 26.00 | 22,600 |
| Pipe Installation | 870 | lf | 27.00 | 23,500 |
| Place Pipe Zone Fill | 605 | CY | 25.00 | 15,100 |
| Manholes | 2 | MH | 5,750.00 | 11,500 |
| Existing Utilities | 870 | lf | 80.00 | 69,600 |
| Dewatering | 870 | lf | 60.00 | 52,200 |
| Traffic Control | 870 | lf | 10.00 | 8,700 |
| | | | Year 1999 subtotal | 518,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 604,000 |

Total: $604,000

## Cost Calculations for Pipe: **21" @19'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1100 ft
Conduit Type: Gravity Sewer
Depth of Cover: 19 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 22.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

### Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,857 | CY | 10.00 | 48,600 |
| Backfill | 3,938 | CY | 25.00 | 98,500 |
| Complete Pavement Restoration | 901 | SY | 50.00 | 45,100 |

| | | | | |
|---|---|---|---|---|
| Overlay Pavement Restoration | 4,477 | SY | 20.00 | 89,500 |
| Trench Safety | 48,840 | SF | 0.50 | 24,400 |
| Spoil Load and Haul | 4,859 | CY | 10.00 | 48,600 |
| Pipe Unit Material Cost | 1,100 | lf | 26.00 | 28,600 |
| Pipe Installation | 1,100 | lf | 27.00 | 29,700 |
| Place Pipe Zone Fill | 765 | CY | 25.00 | 19,100 |
| Manholes | 3 | MH | 4,750.00 | 14,300 |
| Existing Utilities | 1,100 | lf | 80.00 | 88,000 |
| Dewatering | 1,100 | lf | 60.00 | 66,000 |
| Traffic Control | 1,100 | lf | 10.00 | 11,000 |
| | | | Year 1999 subtotal | 611,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 712,000 |

Total: $712,000

---

## Cost Calculations for Pipe: **21" @17'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 460 ft
Conduit Type: Gravity Sewer
Depth of Cover: 17 ft
Trench Backfill Type: Imported

Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 20.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 1,848 | CY | 10.00 | 18,500 |
| Backfill | 1,464 | CY | 25.00 | 36,600 |
| Complete Pavement Restoration | 377 | SY | 50.00 | 18,900 |
| Overlay Pavement Restoration | 1,872 | SY | 20.00 | 37,400 |
| Trench Safety | 18,584 | SF | 0.50 | 9,290 |
| Spoil Load and Haul | 1,849 | CY | 10.00 | 18,500 |
| Pipe Unit Material Cost | 460 | lf | 26.00 | 12,000 |
| Pipe Installation | 460 | lf | 27.00 | 12,400 |
| Place Pipe Zone Fill | 320 | CY | 25.00 | 8,000 |
| Manholes | 1 | MH | 4,250.00 | 4,250 |
| Existing Utilities | 460 | lf | 80.00 | 36,800 |
| Dewatering | 460 | lf | 60.00 | 27,600 |
| Traffic Control | 460 | lf | 10.00 | 4,600 |
| | | | Year 1999 subtotal | 245,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 286,000 |

Total: $286,000

---

## Cost Calculations for Pipe: **21" @16'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1000 ft
Conduit Type: Gravity Sewer
Depth of Cover: 16 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |

| | | |
|---|---|---|
| Excavation Depth | 19.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 3,819 | CY | 10.00 | 38,200 |
| Backfill | 2,983 | CY | 25.00 | 74,600 |
| Complete Pavement Restoration | 819 | SY | 50.00 | 41,000 |
| Overlay Pavement Restoration | 4,070 | SY | 20.00 | 81,400 |
| Trench Safety | 38,400 | SF | 0.50 | 19,200 |
| Spoil Load and Haul | 3,821 | CY | 10.00 | 38,200 |
| Pipe Unit Material Cost | 1,000 | lf | 26.00 | 26,000 |
| Pipe Installation | 1,000 | lf | 27.00 | 27,000 |
| Place Pipe Zone Fill | 695 | CY | 25.00 | 17,400 |
| Manholes | 2 | MH | 4,000.00 | 8,000 |
| Existing Utilities | 1,000 | lf | 80.00 | 80,000 |
| Dewatering | 1,000 | lf | 60.00 | 60,000 |
| Traffic Control | 1,000 | lf | 10.00 | 10,000 |
| | | | Year 1999 subtotal | 521,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 607,000 |

Total: $607,000

---

## Cost Calculations for Pipe: **21" @15'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT*

*include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 270 ft
Conduit Type: Gravity Sewer
Depth of Cover: 15 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 18.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 977 | CY | 10.00 | 9,770 |
| Backfill | 752 | CY | 25.00 | 18,800 |
| Complete Pavement Restoration | 221 | SY | 50.00 | 11,100 |
| Overlay Pavement Restoration | 1,099 | SY | 20.00 | 22,000 |
| Trench Safety | 9,828 | SF | 0.50 | 4,910 |
| Spoil Load and Haul | 978 | CY | 10.00 | 9,780 |
| Pipe Unit Material Cost | 270 | lf | 26.00 | 7,020 |

| | | | | |
|---|---|---|---|---|
| Pipe Installation | 270 | lf | 27.00 | 7,290 |
| Place Pipe Zone Fill | 188 | CY | 25.00 | 4,700 |
| Manholes | 1 | MH | 3,750.00 | 3,750 |
| Existing Utilities | 270 | lf | 80.00 | 21,600 |
| Dewatering | 270 | lf | 60.00 | 16,200 |
| Traffic Control | 270 | lf | 10.00 | 2,700 |
| | | | Year 1999 subtotal | 140,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 163,000 |

Total: $163,000

---

## Cost Calculations for Pipe: **21" @13'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1220 ft
Conduit Type: Gravity Sewer
Depth of Cover: 13 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)

Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 16.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 3,931 | CY | 10.00 | 39,300 |
| Backfill | 2,912 | CY | 25.00 | 72,800 |
| Complete Pavement Restoration | 999 | SY | 50.00 | 50,000 |
| Overlay Pavement Restoration | 4,965 | SY | 20.00 | 99,300 |
| Trench Safety | 39,528 | SF | 0.50 | 19,800 |
| Spoil Load and Haul | 3,933 | CY | 10.00 | 39,300 |
| Pipe Unit Material Cost | 1,220 | lf | 26.00 | 31,700 |
| Pipe Installation | 1,220 | lf | 27.00 | 32,900 |
| Place Pipe Zone Fill | 848 | CY | 25.00 | 21,200 |
| Manholes | 3 | MH | 3,250.00 | 9,750 |
| Existing Utilities | 1,220 | lf | 80.00 | 97,600 |
| Dewatering | 1,220 | lf | 60.00 | 73,200 |
| Traffic Control | 1,220 | lf | 10.00 | 12,200 |
| | | | Year 1999 subtotal | 599,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |

| | |
|---|---|
| Subtotal | 699,000 |

Total: $699,000

---

## Cost Calculations for Pipe: **21" @12'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 510 ft
Conduit Type: Gravity Sewer
Depth of Cover: 12 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 15.2 ft |
| Complete Surface Rest. Width | 7.37 ft |

### Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 1,542 | CY | 10.00 | 15,400 |
| Backfill | 1,116 | CY | 25.00 | 27,900 |
| Complete Pavement Restoration | 418 | SY | 50.00 | 20,900 |
| Overlay Pavement Restoration | 2,076 | SY | 20.00 | 41,500 |
| Trench Safety | 15,504 | SF | 0.50 | 7,750 |
| Spoil Load and Haul | 1,543 | CY | 10.00 | 15,400 |
| Pipe Unit Material Cost | 510 | lf | 26.00 | 13,300 |
| Pipe Installation | 510 | lf | 27.00 | 13,800 |
| Place Pipe Zone Fill | 355 | CY | 25.00 | 8,880 |
| Manholes | 2 | MH | 3,000.00 | 6,000 |
| Existing Utilities | 510 | lf | 80.00 | 40,800 |
| Dewatering | 510 | lf | 60.00 | 30,600 |
| Traffic Control | 510 | lf | 10.00 | 5,100 |
| | | | Year 1999 subtotal | 247,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 288,000 |

Total: $288,000

---

## Cost Calculations for Pipe: **21" @11'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002

Length: 200 ft
Conduit Type: Gravity Sewer
Depth of Cover: 11 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 14.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 565 | CY | 10.00 | 5,650 |
| Backfill | 398 | CY | 25.00 | 9,950 |
| Complete Pavement Restoration | 164 | SY | 50.00 | 8,200 |
| Overlay Pavement Restoration | 814 | SY | 20.00 | 16,300 |
| Trench Safety | 5,680 | SF | 0.50 | 2,840 |
| Spoil Load and Haul | 565 | CY | 10.00 | 5,650 |
| Pipe Unit Material Cost | 200 | lf | 26.00 | 5,200 |
| Pipe Installation | 200 | lf | 27.00 | 5,400 |
| Place Pipe Zone Fill | 139 | CY | 25.00 | 3,480 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 200 | lf | 80.00 | 16,000 |
| Dewatering | 200 | lf | 60.00 | 12,000 |

| | | | | |
|---|---|---|---|---|
| Traffic Control | 200 | lf | 10.00 | 2,000 |
| | | | Year 1999 subtotal | 95,700 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 111,000 |

Total: $111,000

---

## Cost Calculations for Pipe: **21" @10'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1770 ft
Conduit Type: Gravity Sewer
Depth of Cover: 10 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 13.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,647 | CY | 10.00 | 46,500 |
| Backfill | 3,168 | CY | 25.00 | 79,200 |
| Complete Pavement Restoration | 1,449 | SY | 50.00 | 72,500 |
| Overlay Pavement Restoration | 7,204 | SY | 20.00 | 144,000 |
| Trench Safety | 46,728 | SF | 0.50 | 23,400 |
| Spoil Load and Haul | 4,650 | CY | 10.00 | 46,500 |
| Pipe Unit Material Cost | 1,770 | lf | 26.00 | 46,000 |
| Pipe Installation | 1,770 | lf | 27.00 | 47,800 |
| Place Pipe Zone Fill | 1,231 | CY | 25.00 | 30,800 |
| Manholes | 4 | MH | 3,000.00 | 12,000 |
| Existing Utilities | 1,770 | lf | 80.00 | 142,000 |
| Dewatering | 1,770 | lf | 60.00 | 106,000 |
| Traffic Control | 1,770 | lf | 10.00 | 17,700 |
| | | | Year 1999 subtotal | 814,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 949,000 |

Total: $949,000

---

Cost Calculations for Pipe: **21" @9'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 1650 ft
Conduit Type: Gravity Sewer
Depth of Cover: 9 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 12.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,004 | CY | 10.00 | 40,000 |
| Backfill | 2,625 | CY | 25.00 | 65,600 |
| Complete Pavement Restoration | 1,351 | SY | 50.00 | 67,600 |
| Overlay Pavement Restoration | 6,716 | SY | 20.00 | 134,000 |

| | | | | |
|---|---|---|---|---|
| Trench Safety | 40,260 | SF | 0.50 | 20,100 |
| Spoil Load and Haul | 4,007 | CY | 10.00 | 40,100 |
| Pipe Unit Material Cost | 1,650 | lf | 26.00 | 42,900 |
| Pipe Installation | 1,650 | lf | 27.00 | 44,600 |
| Place Pipe Zone Fill | 1,147 | CY | 25.00 | 28,700 |
| Manholes | 4 | MH | 3,000.00 | 12,000 |
| Existing Utilities | 1,650 | lf | 80.00 | 132,000 |
| Dewatering | 1,650 | lf | 60.00 | 99,000 |
| Traffic Control | 1,650 | lf | 10.00 | 16,500 |
| | | | Year 1999 subtotal | 743,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 866,000 |

Total: $866,000

---

## Cost Calculations for Pipe: **21" @8'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 2580 ft
Conduit Type: Gravity Sewer
Depth of Cover: 8 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)

Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 11.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 5,747 | CY | 10.00 | 57,500 |
| Backfill | 3,592 | CY | 25.00 | 89,800 |
| Complete Pavement Restoration | 2,113 | SY | 50.00 | 106,000 |
| Overlay Pavement Restoration | 10,501 | SY | 20.00 | 210,000 |
| Trench Safety | 57,792 | SF | 0.50 | 28,900 |
| Spoil Load and Haul | 5,752 | CY | 10.00 | 57,500 |
| Pipe Unit Material Cost | 2,580 | lf | 26.00 | 67,100 |
| Pipe Installation | 2,580 | lf | 27.00 | 69,700 |
| Place Pipe Zone Fill | 1,794 | CY | 25.00 | 44,900 |
| Manholes | 6 | MH | 3,000.00 | 18,000 |
| Existing Utilities | 2,580 | lf | 80.00 | 206,000 |
| Dewatering | 2,580 | lf | 60.00 | 155,000 |
| Traffic Control | 2,580 | lf | 10.00 | 25,800 |
| | | | Year 1999 subtotal | 1,140,000 |

Mobilization/Demobilization at 10% 1.10

| | |
|---|---|
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 1,330,000 |

Total: $1,330,000

---

## Cost Calculations for Pipe: **21" @7'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 480 ft
Conduit Type: Gravity Sewer
Depth of Cover: 7 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 10.2 ft |

Complete Surface Rest. Width 7.37 ft

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 974 | CY | 10.00 | 9,740 |
| Backfill | 573 | CY | 25.00 | 14,300 |
| Complete Pavement Restoration | 393 | SY | 50.00 | 19,700 |
| Overlay Pavement Restoration | 1,954 | SY | 20.00 | 39,100 |
| Trench Safety | 9,792 | SF | 0.50 | 4,900 |
| Spoil Load and Haul | 975 | CY | 10.00 | 9,750 |
| Pipe Unit Material Cost | 480 | lf | 26.00 | 12,500 |
| Pipe Installation | 480 | lf | 27.00 | 13,000 |
| Place Pipe Zone Fill | 334 | CY | 25.00 | 8,350 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 480 | lf | 80.00 | 38,400 |
| Dewatering | 480 | lf | 60.00 | 28,800 |
| Traffic Control | 480 | lf | 10.00 | 4,800 |
| | | | Year 1999 subtotal | 206,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 241,000 |

Total: $241,000

---

## Cost Calculations for Pipe: **21" @6'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 2130 ft
Conduit Type: Gravity Sewer
Depth of Cover: 6 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 9.21 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 3,902 | CY | 10.00 | 39,000 |
| Backfill | 2,118 | CY | 25.00 | 53,000 |
| Complete Pavement Restoration | 1,744 | SY | 50.00 | 87,200 |
| Overlay Pavement Restoration | 8,669 | SY | 20.00 | 173,000 |
| Trench Safety | 39,235 | SF | 0.50 | 19,600 |
| Spoil Load and Haul | 3,902 | CY | 10.00 | 39,000 |
| Pipe Unit Material Cost | 2,130 | lf | 26.00 | 55,400 |
| Pipe Installation | 2,130 | lf | 27.00 | 57,500 |
| Place Pipe Zone Fill | 1,481 | CY | 25.00 | 37,000 |
| Manholes | 5 | MH | 3,000.00 | 15,000 |

| | | | | |
|---|---|---|---|---|
| Existing Utilities | 2,130 | lf | 80.00 | 170,000 |
| Dewatering | 2,130 | lf | 60.00 | 128,000 |
| Traffic Control | 2,130 | lf | 10.00 | 21,300 |
| | | | Year 1999 subtotal | 895,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 1,040,000 |

Total: $1,040,000

---

## Cost Calculations for Pipe: **21" @5'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 270 ft
Conduit Type: Gravity Sewer
Depth of Cover: 5 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None

Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 8.21 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 441 | CY | 10.00 | 4,410 |
| Backfill | 215 | CY | 25.00 | 5,380 |
| Complete Pavement Restoration | 221 | SY | 50.00 | 11,100 |
| Overlay Pavement Restoration | 1,099 | SY | 20.00 | 22,000 |
| Trench Safety | 4,433 | SF | 0.50 | 2,220 |
| Spoil Load and Haul | 441 | CY | 10.00 | 4,410 |
| Pipe Unit Material Cost | 270 | lf | 26.00 | 7,020 |
| Pipe Installation | 270 | lf | 27.00 | 7,290 |
| Place Pipe Zone Fill | 188 | CY | 25.00 | 4,700 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 270 | lf | 80.00 | 21,600 |
| Dewatering | 270 | lf | 60.00 | 16,200 |
| Traffic Control | 270 | lf | 10.00 | 2,700 |
| | | | Year 1999 subtotal | 112,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 130,000 |

Total: $130,000

## Cost Calculations for Pipe: **21" @4'**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 4165 ft
Conduit Type: Gravity Sewer
Depth of Cover: 4 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 7.21 ft |
| Complete Surface Rest. Width | 7.37 ft |

### Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 5,973 | CY | 10.00 | 59,700 |
| Backfill | 2,485 | CY | 25.00 | 62,100 |

| | | | | |
|---|---|---|---|---|
| Complete Pavement Restoration | 3,411 | SY | 50.00 | 171,000 |
| Overlay Pavement Restoration | 16,952 | SY | 20.00 | 339,000 |
| Trench Safety | 60,059 | SF | 0.50 | 30,000 |
| Spoil Load and Haul | 5,973 | CY | 10.00 | 59,700 |
| Pipe Unit Material Cost | 4,165 | lf | 26.00 | 108,000 |
| Pipe Installation | 4,165 | lf | 27.00 | 112,000 |
| Place Pipe Zone Fill | 2,896 | CY | 25.00 | 72,400 |
| Manholes | 9 | MH | 3,000.00 | 27,000 |
| Existing Utilities | 4,165 | lf | 80.00 | 333,000 |
| Dewatering | 4,165 | lf | 60.00 | 250,000 |
| Traffic Control | 4,165 | lf | 10.00 | 41,700 |
| | | | Year 1999 subtotal | 1,670,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 1,950,000 |

Total: $1,950,000

---

## Cost Calculations for Project: **18"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Project Year: 2002

Comments:

### Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 18" @10' | Pipe | 2002 | 93,600 | 1.00 | 93,600 |
| 18" @9' | Pipe | 2002 | 509,000 | 1.00 | 509,000 |
| 18" @7' | Pipe | 2002 | 201,000 | 1.00 | 201,000 |
| 18" @6' | Pipe | 2002 | 631,000 | 1.00 | 631,000 |
| 18" @5' | Pipe | 2002 | 206,000 | 1.00 | 206,000 |
| 18" @4' | Pipe | 2002 | 543,000 | 1.00 | 543,000 |
| | | | | Subtotal | 2,180,000 |

Total: $2,180,000

---

## Cost Calculations for Pipe: **18" @10'**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 210 ft
Conduit Type: Gravity Sewer
Depth of Cover: 10 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 12.9 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 502 | CY | 10.00 | 5,020 |
| Backfill | 350 | CY | 25.00 | 8,750 |
| Complete Pavement Restoration | 163 | SY | 50.00 | 8,150 |
| Overlay Pavement Restoration | 350 | SY | 20.00 | 7,000 |
| Trench Safety | 5,418 | SF | 0.50 | 2,710 |
| Spoil Load and Haul | 502 | CY | 10.00 | 5,020 |
| Pipe Unit Material Cost | 210 | lf | 23.00 | 4,830 |
| Pipe Installation | 210 | lf | 25.00 | 5,250 |
| Place Pipe Zone Fill | 130 | CY | 25.00 | 3,250 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 210 | lf | 60.00 | 12,600 |
| Dewatering | 210 | lf | 60.00 | 12,600 |
| Traffic Control | 210 | lf | 10.00 | 2,100 |
| | | | Year 1999 subtotal | 80,300 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 93,600 |

Total: $93,600

---

## Cost Calculations for Pipe: **18" @9'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 1190 ft
Conduit Type: Gravity Sewer
Depth of Cover: 9 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 11.9 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 2,622 | CY | 10.00 | 26,200 |
| Backfill | 1,763 | CY | 25.00 | 44,100 |
| Complete Pavement Restoration | 926 | SY | 50.00 | 46,300 |
| Overlay Pavement Restoration | 1,983 | SY | 20.00 | 39,700 |
| Trench Safety | 28,322 | SF | 0.50 | 14,200 |
| Spoil Load and Haul | 2,627 | CY | 10.00 | 26,300 |

| | | | | |
|---|---|---|---|---|
| Pipe Unit Material Cost | 1,190 | lf | 23.00 | 27,400 |
| Pipe Installation | 1,190 | lf | 25.00 | 29,800 |
| Place Pipe Zone Fill | 736 | CY | 25.00 | 18,400 |
| Manholes | 3 | MH | 3,000.00 | 9,000 |
| Existing Utilities | 1,190 | lf | 60.00 | 71,400 |
| Dewatering | 1,190 | lf | 60.00 | 71,400 |
| Traffic Control | 1,190 | lf | 10.00 | 11,900 |
| | | | Year 1999 subtotal | 436,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 509,000 |

Total: $509,000

---

## Cost Calculations for Pipe: **18" @7'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 500 ft
Conduit Type: Gravity Sewer
Depth of Cover: 7 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant

Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 9.92 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 919 | CY | 10.00 | 9,190 |
| Backfill | 556 | CY | 25.00 | 13,900 |
| Complete Pavement Restoration | 389 | SY | 50.00 | 19,500 |
| Overlay Pavement Restoration | 833 | SY | 20.00 | 16,700 |
| Trench Safety | 9,920 | SF | 0.50 | 4,960 |
| Spoil Load and Haul | 919 | CY | 10.00 | 9,190 |
| Pipe Unit Material Cost | 500 | lf | 23.00 | 11,500 |
| Pipe Installation | 500 | lf | 25.00 | 12,500 |
| Place Pipe Zone Fill | 309 | CY | 25.00 | 7,730 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 500 | lf | 60.00 | 30,000 |
| Dewatering | 500 | lf | 60.00 | 30,000 |
| Traffic Control | 500 | lf | 10.00 | 5,000 |
| | | | Year 1999 subtotal | 173,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |

| | |
|---|---|
| Subtotal | 201,000 |

Total: $201,000

---

## Cost Calculations for Pipe: **18" @6'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1600 ft
Conduit Type: Gravity Sewer
Depth of Cover: 6 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 8.92 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 2,643 | CY | 10.00 | 26,400 |
| Backfill | 1,481 | CY | 25.00 | 37,000 |
| Complete Pavement Restoration | 1,244 | SY | 50.00 | 62,200 |
| Overlay Pavement Restoration | 2,667 | SY | 20.00 | 53,300 |
| Trench Safety | 28,544 | SF | 0.50 | 14,300 |
| Spoil Load and Haul | 2,643 | CY | 10.00 | 26,400 |
| Pipe Unit Material Cost | 1,600 | lf | 23.00 | 36,800 |
| Pipe Installation | 1,600 | lf | 25.00 | 40,000 |
| Place Pipe Zone Fill | 990 | CY | 25.00 | 24,800 |
| Manholes | 4 | MH | 3,000.00 | 12,000 |
| Existing Utilities | 1,600 | lf | 60.00 | 96,000 |
| Dewatering | 1,600 | lf | 60.00 | 96,000 |
| Traffic Control | 1,600 | lf | 10.00 | 16,000 |
| | | | Year 1999 subtotal | 541,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 631,000 |

Total: $631,000

---

## Cost Calculations for Pipe: **18" @5'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 530 ft
Conduit Type: Gravity Sewer
Depth of Cover: 5 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 7.92 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 777 | CY | 10.00 | 7,770 |
| Backfill | 393 | CY | 25.00 | 9,830 |
| Complete Pavement Restoration | 412 | SY | 50.00 | 20,600 |
| Overlay Pavement Restoration | 883 | SY | 20.00 | 17,700 |
| Trench Safety | 8,395 | SF | 0.50 | 4,200 |
| Spoil Load and Haul | 777 | CY | 10.00 | 7,770 |
| Pipe Unit Material Cost | 530 | lf | 23.00 | 12,200 |
| Pipe Installation | 530 | lf | 25.00 | 13,300 |
| Place Pipe Zone Fill | 328 | CY | 25.00 | 8,200 |
| Manholes | 2 | MH | 3,000.00 | 6,000 |
| Existing Utilities | 530 | lf | 60.00 | 31,800 |

| | | | | |
|---|---|---|---|---|
| Dewatering | 530 | lf | 60.00 | 31,800 |
| Traffic Control | 530 | lf | 10.00 | 5,300 |
| | | | Year 1999 subtotal | 176,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 206,000 |

Total: $206,000

---

## Cost Calculations for Pipe: **18" @4'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1460 ft
Conduit Type: Gravity Sewer
Depth of Cover: 4 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard

Pipe Diameter: 18 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 6.92 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 1,871 | CY | 10.00 | 18,700 |
| Backfill | 811 | CY | 25.00 | 20,300 |
| Complete Pavement Restoration | 1,136 | SY | 50.00 | 56,800 |
| Overlay Pavement Restoration | 2,433 | SY | 20.00 | 48,700 |
| Trench Safety | 20,206 | SF | 0.50 | 10,100 |
| Spoil Load and Haul | 1,871 | CY | 10.00 | 18,700 |
| Pipe Unit Material Cost | 1,460 | lf | 23.00 | 33,600 |
| Pipe Installation | 1,460 | lf | 25.00 | 36,500 |
| Place Pipe Zone Fill | 903 | CY | 25.00 | 22,600 |
| Manholes | 3 | MH | 3,000.00 | 9,000 |
| Existing Utilities | 1,460 | lf | 60.00 | 87,600 |
| Dewatering | 1,460 | lf | 60.00 | 87,600 |
| Traffic Control | 1,460 | lf | 10.00 | 14,600 |
| | | | Year 1999 subtotal | 465,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 543,000 |

Total: $543,000

## Cost Calculations for Project: **15"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Project Year: 2002

Comments:

Sub Items

| Name | Type | Year Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|
| 15" @11' | Pipe | 2002 386,000 | 1.00 | 386,000 |
| | | | Subtotal | 386,000 |

Total: $386,000

---

## Cost Calculations for Pipe: **15" @11'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002

Length: 800 ft

Conduit Type: Gravity Sewer

Depth of Cover: 11 ft

Trench Backfill Type: Imported

Manhole Spacing: Average (500 ft)

Existing Utilities: Complex

Dewatering: Significant

Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 15 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.67 | ft |
| Trench Width | 4.67 | ft |
| Excavation Depth | 13.7 | ft |
| Complete Surface Rest. Width | 6.67 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 1,896 | CY | 10.00 | 19,000 |
| Backfill | 1,384 | CY | 25.00 | 34,600 |
| Complete Pavement Restoration | 593 | SY | 50.00 | 29,700 |
| Overlay Pavement Restoration | 3,318 | SY | 20.00 | 66,400 |
| Trench Safety | 21,920 | SF | 0.50 | 11,000 |
| Spoil Load and Haul | 1,892 | CY | 10.00 | 18,900 |
| Pipe Unit Material Cost | 800 | lf | 18.00 | 14,400 |
| Pipe Installation | 800 | lf | 20.00 | 16,000 |
| Place Pipe Zone Fill | 443 | CY | 25.00 | 11,100 |
| Manholes | 2 | MH | 3,000.00 | 6,000 |
| Existing Utilities | 800 | lf | 60.00 | 48,000 |
| Dewatering | 800 | lf | 60.00 | 48,000 |
| Traffic Control | 800 | lf | 10.00 | 8,000 |
| | | | Year 1999 subtotal | 331,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |

| | |
|---|---|
| Subtotal | 386,000 |

Total: $386,000

---

## Cost Calculations for Project: **12"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Project Year: 2002

Comments:

### Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 12" @7' | Pipe | 2002 | 121,000 | 1.00 | 121,000 |
| 12" @4' | Pipe | 2002 | 24,500 | 1.00 | 24,500 |
| | | | | Subtotal | 146,000 |

Total: $146,000

---

## Cost Calculations for Pipe: **12" @7'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002

Length: 310 ft
Conduit Type: Gravity Sewer
Depth of Cover: 7 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 12 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.42 | ft |
| Trench Width | 4.35 | ft |
| Excavation Depth | 9.42 | ft |
| Complete Surface Rest. Width | 6.35 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 470 | CY | 10.00 | 4,700 |
| Backfill | 300 | CY | 25.00 | 7,500 |
| Complete Pavement Restoration | 219 | SY | 50.00 | 11,000 |
| Overlay Pavement Restoration | 1,297 | SY | 20.00 | 25,900 |
| Trench Safety | 5,840 | SF | 0.50 | 2,920 |
| Spoil Load and Haul | 470 | CY | 10.00 | 4,700 |
| Pipe Unit Material Cost | 310 | lf | 15.00 | 4,650 |
| Pipe Installation | 310 | lf | 15.00 | 4,650 |
| Place Pipe Zone Fill | 153 | CY | 25.00 | 3,830 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 310 | lf | 40.00 | 12,400 |
| Dewatering | 310 | lf | 50.00 | 15,500 |

| | | | | |
|---|---|---|---|---|
| Traffic Control | 310 | lf | 10.00 | 3,100 |
| | | | Year 1999 subtotal | 104,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 121,000 |

Total: $121,000

---

## Cost Calculations for Pipe: **12" @4'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 60 ft
Conduit Type: Gravity Sewer
Depth of Cover: 4 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 12 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.42 | ft |
| Trench Width | 4.35 | ft |
| Excavation Depth | 6.42 | ft |
| Complete Surface Rest. Width | 6.35 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 62 | CY | 10.00 | 620 |
| Backfill | 29 | CY | 25.00 | 725 |
| Complete Pavement Restoration | 42 | SY | 50.00 | 2,100 |
| Overlay Pavement Restoration | 251 | SY | 20.00 | 5,020 |
| Trench Safety | 770 | SF | 0.50 | 385 |
| Spoil Load and Haul | 62 | CY | 10.00 | 620 |
| Pipe Unit Material Cost | 60 | lf | 15.00 | 900 |
| Pipe Installation | 60 | lf | 15.00 | 900 |
| Place Pipe Zone Fill | 30 | CY | 25.00 | 750 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 60 | lf | 40.00 | 2,400 |
| Dewatering | 60 | lf | 50.00 | 3,000 |
| Traffic Control | 60 | lf | 10.00 | 600 |
| | | Year 1999 subtotal | | 21,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 24,500 |

Total: $24,500

---

Cost Calculations for Project: **10"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Project Year: 2002

Comments:

Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 10" @7' | Pipe | 2002 | 114,000 | 1.00 | 114,000 |
| 10" @4' | Pipe | 2002 | 23,400 | 1.00 | 23,400 |
| | | | | Subtotal | 137,000 |

Total: $137,000

---

## Cost Calculations for Pipe: **10" @7'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002

Length: 310 ft

Conduit Type: Gravity Sewer

Depth of Cover: 7 ft

Trench Backfill Type: Imported

Manhole Spacing: Average (500 ft)

Existing Utilities: Complex

Dewatering: Significant

Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 10 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.04 | ft |
| Trench Width | 3.85 | ft |
| Excavation Depth | 9.04 | ft |
| Complete Surface Rest. Width | 5.85 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 400 | CY | 10.00 | 4,000 |
| Backfill | 265 | CY | 25.00 | 6,630 |
| Complete Pavement Restoration | 202 | SY | 50.00 | 10,100 |
| Overlay Pavement Restoration | 1,314 | SY | 20.00 | 26,300 |
| Trench Safety | 5,605 | SF | 0.50 | 2,800 |
| Spoil Load and Haul | 400 | CY | 10.00 | 4,000 |
| Pipe Unit Material Cost | 310 | lf | 12.00 | 3,720 |
| Pipe Installation | 310 | lf | 12.00 | 3,720 |
| Place Pipe Zone Fill | 125 | CY | 25.00 | 3,130 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 310 | lf | 40.00 | 12,400 |
| Dewatering | 310 | lf | 50.00 | 15,500 |
| Traffic Control | 310 | lf | 10.00 | 3,100 |
| | | | Year 1999 subtotal | 98,400 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |

| | |
|---|---|
| Subtotal | 114,000 |

Total: $114,000

---

## Cost Calculations for Pipe: **10" @4'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 60 ft
Conduit Type: Gravity Sewer
Depth of Cover: 4 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 10 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.04 | ft |
| Trench Width | 3.85 | ft |
| Excavation Depth | 6.04 | ft |
| Complete Surface Rest. Width | 5.85 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 52 | CY | 10.00 | 520 |
| Backfill | 26 | CY | 25.00 | 650 |
| Complete Pavement Restoration | 39 | SY | 50.00 | 1,950 |
| Overlay Pavement Restoration | 254 | SY | 20.00 | 5,080 |
| Trench Safety | 725 | SF | 0.50 | 363 |
| Spoil Load and Haul | 52 | CY | 10.00 | 520 |
| Pipe Unit Material Cost | 60 | lf | 12.00 | 720 |
| Pipe Installation | 60 | lf | 12.00 | 720 |
| Place Pipe Zone Fill | 24 | CY | 25.00 | 600 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 60 | lf | 40.00 | 2,400 |
| Dewatering | 60 | lf | 50.00 | 3,000 |
| Traffic Control | 60 | lf | 10.00 | 600 |
| | | | Year 1999 subtotal | 20,100 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 23,400 |

Total: $23,400

---

## Cost Calculations for Project: **SR18 w/LS11 (open cut)**

Project year: 2001

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Project Year: 2001

Comments:

Sub Items

| Name | Type | Year | Cost | Multiplier | 2001 Cost |
|---|---|---|---|---|---|
| 42" | Pipe | 2002 | 3,850,000 | 0.97 | 3,730,000 |
| 30" | Pipe | 2002 | 2,640,000 | 0.97 | 2,560,000 |
| | | | | Subtotal | 6,290,000 |

Total: $6,290,000

---

## Cost Calculations for Pipe: **42"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002

Length: 5000 ft

Conduit Type: Gravity Sewer

Depth of Cover: 11 ft

Trench Backfill Type: Imported

Manhole Spacing: Average (500 ft)

Existing Utilities: Complex

Dewatering: Significant

Pavement Restoration: Half Width - Arterial (22 ft)

Traffic: Heavy

Land Acquisition: None

Required Easements: None

Trench Safety: Standard

Pipe Diameter: 42 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 4.25 | ft |
| Trench Width | 8.03 | ft |
| Excavation Depth | 16.3 | ft |
| Complete Surface Rest. Width | 10 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 24,239 | CY | 10.00 | 242,000 |
| Backfill | 14,870 | CY | 25.00 | 372,000 |
| Complete Pavement Restoration | 5,556 | SY | 50.00 | 278,000 |
| Overlay Pavement Restoration | 6,667 | SY | 20.00 | 133,000 |
| Trench Safety | 163,000 | SF | 0.50 | 81,500 |
| Spoil Load and Haul | 24,164 | CY | 10.00 | 242,000 |
| Pipe Unit Material Cost | 5,000 | lf | 78.00 | 390,000 |
| Pipe Installation | 5,000 | lf | 60.00 | 300,000 |
| Place Pipe Zone Fill | 6,667 | CY | 25.00 | 167,000 |
| Manholes | 10 | MH | 9,000.00 | 90,000 |
| Existing Utilities | 5,000 | lf | 100.00 | 500,000 |
| Dewatering | 5,000 | lf | 80.00 | 400,000 |
| Traffic Control | 5,000 | lf | 20.00 | 100,000 |
| | | | Year 1999 subtotal | 3,300,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 3,850,000 |

Total: $3,850,000

---

## Cost Calculations for Pipe: **30"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 4950 ft
Conduit Type: Gravity Sewer
Depth of Cover: 5 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 30 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 3.08 | ft |
| Trench Width | 6.5 | ft |
| Excavation Depth | 9.08 | ft |
| Complete Surface Rest. Width | 8.5 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 10,820 | CY | 10.00 | 108,000 |
| Backfill | 4,767 | CY | 25.00 | 119,000 |
| Complete Pavement Restoration | 4,675 | SY | 50.00 | 234,000 |
| Overlay Pavement Restoration | 7,425 | SY | 20.00 | 149,000 |

| | | | | |
|---|---|---|---|---|
| Trench Safety | 89,892 | SF | 0.50 | 44,900 |
| Spoil Load and Haul | 10,820 | CY | 10.00 | 108,000 |
| Pipe Unit Material Cost | 4,950 | lf | 50.00 | 248,000 |
| Pipe Installation | 4,950 | lf | 40.00 | 198,000 |
| Place Pipe Zone Fill | 4,688 | CY | 25.00 | 117,000 |
| Manholes | 10 | MH | 9,000.00 | 90,000 |
| Existing Utilities | 4,950 | lf | 80.00 | 396,000 |
| Dewatering | 4,950 | lf | 70.00 | 347,000 |
| Traffic Control | 4,950 | lf | 20.00 | 99,000 |
| | | | Year 1999 subtotal | 2,260,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 2,640,000 |

Total: $2,640,000

---

## Cost Calculations for Project: **BD Parallel Section 3A(1)/3A(1A)/3A(2)**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Project Year: 2002

Comments:

### Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 21" | Project | 2002 | 0 | 1.00 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 21" @30' | Pipe | 2002 | 328,000 | 1.00 | 328,000 |
| 21" @28' | Pipe | 2002 | 517,000 | 1.00 | 517,000 |
| 21" @26' | Pipe | 2002 | 844,000 | 1.00 | 844,000 |
| 21" @25' | Pipe | 2002 | 338,000 | 1.00 | 338,000 |
| 21" @24' | Pipe | 2002 | 512,000 | 1.00 | 512,000 |
| 21" @23' | Pipe | 2002 | 604,000 | 1.00 | 604,000 |
| 21" @19' | Pipe | 2002 | 712,000 | 1.00 | 712,000 |
| 21" @17' | Pipe | 2002 | 286,000 | 1.00 | 286,000 |
| 21" @16' | Pipe | 2002 | 1,460,000 | 1.00 | 1,460,000 |
| 21" @15' | Pipe | 2002 | 342,000 | 1.00 | 342,000 |
| 21" @13' | Pipe | 2002 | 699,000 | 1.00 | 699,000 |
| 21" @12' | Pipe | 2002 | 1,140,000 | 1.00 | 1,140,000 |
| 21" @11' | Pipe | 2002 | 111,000 | 1.00 | 111,000 |
| 21" @10' | Pipe | 2002 | 949,000 | 1.00 | 949,000 |
| 21" @9' | Pipe | 2002 | 866,000 | 1.00 | 866,000 |
| 21" @8' | Pipe | 2002 | 1,330,000 | 1.00 | 1,330,000 |
| 21" @7' | Pipe | 2002 | 241,000 | 1.00 | 241,000 |
| 21" @6' | Pipe | 2002 | 1,040,000 | 1.00 | 1,040,000 |
| 21" @5' | Pipe | 2002 | 130,000 | 1.00 | 130,000 |
| 21" @4' | Pipe | 2002 | 1,950,000 | 1.00 | 1,950,000 |
| 18" | Project | 2002 | 0 | 1.00 | 0 |
| 18" @10' | Pipe | 2002 | 218,000 | 1.00 | 218,000 |
| 18" @9' | Pipe | 2002 | 509,000 | 1.00 | 509,000 |
| 18" @7' | Pipe | 2002 | 201,000 | 1.00 | 201,000 |
| 18" @6' | Pipe | 2002 | 930,000 | 1.00 | 930,000 |
| 18" @5' | Pipe | 2002 | 805,000 | 1.00 | 805,000 |
| 18" @4' | Pipe | 2002 | 543,000 | 1.00 | 543,000 |
| 15" | Project | 2002 | 0 | 1.00 | 0 |
| 15" @11' | Pipe | 2002 | 386,000 | 1.00 | 386,000 |
| 12" | Project | 2002 | 0 | 1.00 | 0 |
| 12" @7' | Pipe | 2002 | 121,000 | 1.00 | 121,000 |
| 12" @4' | Pipe | 2002 | 24,500 | 1.00 | 24,500 |
| 10" | Project | 2002 | 0 | 1.00 | 0 |
| 10" @7' | Pipe | 2002 | 114,000 | 1.00 | 114,000 |
| 10" @4' | Pipe | 2002 | 23,400 | 1.00 | 23,400 |

Subtotal 18,300,000

Total: $18,300,000

---

## Cost Calculations for Project: **21"**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Project Year: 2002

Comments:

### Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 21" @30' | Pipe | 2002 | 328,000 | 1.00 | 328,000 |
| 21" @28' | Pipe | 2002 | 517,000 | 1.00 | 517,000 |
| 21" @26' | Pipe | 2002 | 844,000 | 1.00 | 844,000 |
| 21" @25' | Pipe | 2002 | 338,000 | 1.00 | 338,000 |
| 21" @24' | Pipe | 2002 | 512,000 | 1.00 | 512,000 |
| 21" @23' | Pipe | 2002 | 604,000 | 1.00 | 604,000 |
| 21" @19' | Pipe | 2002 | 712,000 | 1.00 | 712,000 |
| 21" @17' | Pipe | 2002 | 286,000 | 1.00 | 286,000 |
| 21" @16' | Pipe | 2002 | 1,460,000 | 1.00 | 1,460,000 |
| 21" @15' | Pipe | 2002 | 342,000 | 1.00 | 342,000 |
| 21" @13' | Pipe | 2002 | 699,000 | 1.00 | 699,000 |
| 21" @12' | Pipe | 2002 | 1,140,000 | 1.00 | 1,140,000 |
| 21" @11' | Pipe | 2002 | 111,000 | 1.00 | 111,000 |
| 21" @10' | Pipe | 2002 | 949,000 | 1.00 | 949,000 |
| 21" @9' | Pipe | 2002 | 866,000 | 1.00 | 866,000 |
| 21" @8' | Pipe | 2002 | 1,330,000 | 1.00 | 1,330,000 |
| 21" @7' | Pipe | 2002 | 241,000 | 1.00 | 241,000 |

| | | | | | |
|---|---|---|---|---|---|
| 21" @6' | Pipe | 2002 | 1,040,000 | 1.00 | 1,040,000 |
| 21" @5' | Pipe | 2002 | 130,000 | 1.00 | 130,000 |
| 21" @4' | Pipe | 2002 | 1,950,000 | 1.00 | 1,950,000 |
| | | | | Subtotal | 14,400,000 |

Total: $14,400,000

---

## Cost Calculations for Pipe: **21" @30'**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 420 ft
Conduit Type: Gravity Sewer
Depth of Cover: 30 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 33.2 ft |

Complete Surface Rest. Width 7.37 ft

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 2,773 | CY | 10.00 | 27,700 |
| Backfill | 2,422 | CY | 25.00 | 60,600 |
| Complete Pavement Restoration | 344 | SY | 50.00 | 17,200 |
| Overlay Pavement Restoration | 1,709 | SY | 20.00 | 34,200 |
| Trench Safety | 27,888 | SF | 0.50 | 13,900 |
| Spoil Load and Haul | 2,774 | CY | 10.00 | 27,700 |
| Pipe Unit Material Cost | 420 | lf | 26.00 | 10,900 |
| Pipe Installation | 420 | lf | 27.00 | 11,300 |
| Place Pipe Zone Fill | 292 | CY | 25.00 | 7,300 |
| Manholes | 1 | MH | 7,500.00 | 7,500 |
| Existing Utilities | 420 | lf | 80.00 | 33,600 |
| Dewatering | 420 | lf | 60.00 | 25,200 |
| Traffic Control | 420 | lf | 10.00 | 4,200 |
| | | | Year 1999 subtotal | 281,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 328,000 |

Total: $328,000

---

## Cost Calculations for Pipe: **21" @28'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 680 ft
Conduit Type: Gravity Sewer
Depth of Cover: 28 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 31.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,220 | CY | 10.00 | 42,200 |
| Backfill | 3,652 | CY | 25.00 | 91,300 |
| Complete Pavement Restoration | 557 | SY | 50.00 | 27,900 |
| Overlay Pavement Restoration | 2,768 | SY | 20.00 | 55,400 |
| Trench Safety | 42,432 | SF | 0.50 | 21,200 |
| Spoil Load and Haul | 4,221 | CY | 10.00 | 42,200 |
| Pipe Unit Material Cost | 680 | lf | 26.00 | 17,700 |
| Pipe Installation | 680 | lf | 27.00 | 18,400 |
| Place Pipe Zone Fill | 473 | CY | 25.00 | 11,800 |
| Manholes | 2 | MH | 7,000.00 | 14,000 |

| | | | | |
|---|---|---|---|---|
| Existing Utilities | 680 | lf | 80.00 | 54,400 |
| Dewatering | 680 | lf | 60.00 | 40,800 |
| Traffic Control | 680 | lf | 10.00 | 6,800 |
| | | | Year 1999 subtotal | 444,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 517,000 |

Total: $517,000

---

## Cost Calculations for Pipe: **21" @26'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1150 ft
Conduit Type: Gravity Sewer
Depth of Cover: 26 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None

Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 29.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 6,679 | CY | 10.00 | 66,800 |
| Backfill | 5,718 | CY | 25.00 | 143,000 |
| Complete Pavement Restoration | 942 | SY | 50.00 | 47,100 |
| Overlay Pavement Restoration | 4,681 | SY | 20.00 | 93,600 |
| Trench Safety | 67,160 | SF | 0.50 | 33,600 |
| Spoil Load and Haul | 6,681 | CY | 10.00 | 66,800 |
| Pipe Unit Material Cost | 1,150 | lf | 26.00 | 29,900 |
| Pipe Installation | 1,150 | lf | 27.00 | 31,100 |
| Place Pipe Zone Fill | 800 | CY | 25.00 | 20,000 |
| Manholes | 3 | MH | 6,500.00 | 19,500 |
| Existing Utilities | 1,150 | lf | 80.00 | 92,000 |
| Dewatering | 1,150 | lf | 60.00 | 69,000 |
| Traffic Control | 1,150 | lf | 10.00 | 11,500 |
| | | | Year 1999 subtotal | 724,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 844,000 |

Total: $844,000

## Cost Calculations for Pipe: **21" @25'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 470 ft
Conduit Type: Gravity Sewer
Depth of Cover: 25 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 28.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

### Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 2,636 | CY | 10.00 | 26,400 |
| Backfill | 2,243 | CY | 25.00 | 56,100 |

| | | | | |
|---|---|---|---|---|
| Complete Pavement Restoration | 385 | SY | 50.00 | 19,300 |
| Overlay Pavement Restoration | 1,913 | SY | 20.00 | 38,300 |
| Trench Safety | 26,508 | SF | 0.50 | 13,300 |
| Spoil Load and Haul | 2,637 | CY | 10.00 | 26,400 |
| Pipe Unit Material Cost | 470 | lf | 26.00 | 12,200 |
| Pipe Installation | 470 | lf | 27.00 | 12,700 |
| Place Pipe Zone Fill | 327 | CY | 25.00 | 8,180 |
| Manholes | 1 | MH | 6,250.00 | 6,250 |
| Existing Utilities | 470 | lf | 80.00 | 37,600 |
| Dewatering | 470 | lf | 60.00 | 28,200 |
| Traffic Control | 470 | lf | 10.00 | 4,700 |
| | | | Year 1999 subtotal | 290,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 338,000 |

Total: $338,000

---

## Cost Calculations for Pipe: **21" @24'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002

Length: 720 ft

Conduit Type: Gravity Sewer

Depth of Cover: 24 ft

Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 27.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 3,895 | CY | 10.00 | 39,000 |
| Backfill | 3,294 | CY | 25.00 | 82,400 |
| Complete Pavement Restoration | 590 | SY | 50.00 | 29,500 |
| Overlay Pavement Restoration | 2,930 | SY | 20.00 | 58,600 |
| Trench Safety | 39,168 | SF | 0.50 | 19,600 |
| Spoil Load and Haul | 3,896 | CY | 10.00 | 39,000 |
| Pipe Unit Material Cost | 720 | lf | 26.00 | 18,700 |
| Pipe Installation | 720 | lf | 27.00 | 19,400 |
| Place Pipe Zone Fill | 501 | CY | 25.00 | 12,500 |
| Manholes | 2 | MH | 6,000.00 | 12,000 |
| Existing Utilities | 720 | lf | 80.00 | 57,600 |
| Dewatering | 720 | lf | 60.00 | 43,200 |
| Traffic Control | 720 | lf | 10.00 | 7,200 |
| | | | Year 1999 subtotal | 439,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 512,000 |

Total: $512,000

---

## Cost Calculations for Pipe: **21" @23'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 870 ft
Conduit Type: Gravity Sewer
Depth of Cover: 23 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |

| | | |
|---|---|---|
| Excavation Depth | 26.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,533 | CY | 10.00 | 45,300 |
| Backfill | 3,807 | CY | 25.00 | 95,200 |
| Complete Pavement Restoration | 712 | SY | 50.00 | 35,600 |
| Overlay Pavement Restoration | 3,541 | SY | 20.00 | 70,800 |
| Trench Safety | 45,588 | SF | 0.50 | 22,800 |
| Spoil Load and Haul | 4,535 | CY | 10.00 | 45,400 |
| Pipe Unit Material Cost | 870 | lf | 26.00 | 22,600 |
| Pipe Installation | 870 | lf | 27.00 | 23,500 |
| Place Pipe Zone Fill | 605 | CY | 25.00 | 15,100 |
| Manholes | 2 | MH | 5,750.00 | 11,500 |
| Existing Utilities | 870 | lf | 80.00 | 69,600 |
| Dewatering | 870 | lf | 60.00 | 52,200 |
| Traffic Control | 870 | lf | 10.00 | 8,700 |
| | | | Year 1999 subtotal | 518,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 604,000 |

Total: $604,000

---

## Cost Calculations for Pipe: **21" @19'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT*

*include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 1100 ft
Conduit Type: Gravity Sewer
Depth of Cover: 19 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 22.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,857 | CY | 10.00 | 48,600 |
| Backfill | 3,938 | CY | 25.00 | 98,500 |
| Complete Pavement Restoration | 901 | SY | 50.00 | 45,100 |
| Overlay Pavement Restoration | 4,477 | SY | 20.00 | 89,500 |
| Trench Safety | 48,840 | SF | 0.50 | 24,400 |
| Spoil Load and Haul | 4,859 | CY | 10.00 | 48,600 |
| Pipe Unit Material Cost | 1,100 | lf | 26.00 | 28,600 |

| | | | | |
|---|---|---|---|---|
| Pipe Installation | 1,100 | lf | 27.00 | 29,700 |
| Place Pipe Zone Fill | 765 | CY | 25.00 | 19,100 |
| Manholes | 3 | MH | 4,750.00 | 14,300 |
| Existing Utilities | 1,100 | lf | 80.00 | 88,000 |
| Dewatering | 1,100 | lf | 60.00 | 66,000 |
| Traffic Control | 1,100 | lf | 10.00 | 11,000 |
| | | | Year 1999 subtotal | 611,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 712,000 |

Total: $712,000

---

## Cost Calculations for Pipe: **21" @17'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 460 ft
Conduit Type: Gravity Sewer
Depth of Cover: 17 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)

Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 20.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 1,848 | CY | 10.00 | 18,500 |
| Backfill | 1,464 | CY | 25.00 | 36,600 |
| Complete Pavement Restoration | 377 | SY | 50.00 | 18,900 |
| Overlay Pavement Restoration | 1,872 | SY | 20.00 | 37,400 |
| Trench Safety | 18,584 | SF | 0.50 | 9,290 |
| Spoil Load and Haul | 1,849 | CY | 10.00 | 18,500 |
| Pipe Unit Material Cost | 460 | lf | 26.00 | 12,000 |
| Pipe Installation | 460 | lf | 27.00 | 12,400 |
| Place Pipe Zone Fill | 320 | CY | 25.00 | 8,000 |
| Manholes | 1 | MH | 4,250.00 | 4,250 |
| Existing Utilities | 460 | lf | 80.00 | 36,800 |
| Dewatering | 460 | lf | 60.00 | 27,600 |
| Traffic Control | 460 | lf | 10.00 | 4,600 |
| | | | Year 1999 subtotal | 245,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |

| | |
|---|---|
| Subtotal | 286,000 |

Total: $286,000

---

## Cost Calculations for Pipe: **21" @16'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 2400 ft
Conduit Type: Gravity Sewer
Depth of Cover: 16 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 19.2 ft |
| Complete Surface Rest. Width | 7.37 ft |

### Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 9,165 | CY | 10.00 | 91,700 |
| Backfill | 7,160 | CY | 25.00 | 179,000 |
| Complete Pavement Restoration | 1,965 | SY | 50.00 | 98,300 |
| Overlay Pavement Restoration | 9,768 | SY | 20.00 | 195,000 |
| Trench Safety | 92,160 | SF | 0.50 | 46,100 |
| Spoil Load and Haul | 9,170 | CY | 10.00 | 91,700 |
| Pipe Unit Material Cost | 2,400 | lf | 26.00 | 62,400 |
| Pipe Installation | 2,400 | lf | 27.00 | 64,800 |
| Place Pipe Zone Fill | 1,669 | CY | 25.00 | 41,700 |
| Manholes | 5 | MH | 4,000.00 | 20,000 |
| Existing Utilities | 2,400 | lf | 80.00 | 192,000 |
| Dewatering | 2,400 | lf | 60.00 | 144,000 |
| Traffic Control | 2,400 | lf | 10.00 | 24,000 |
| | | | Year 1999 subtotal | 1,250,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 1,460,000 |

Total: $1,460,000

---

## Cost Calculations for Pipe: **21" @15'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002

Length: 570 ft
Conduit Type: Gravity Sewer
Depth of Cover: 15 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 18.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 2,063 | CY | 10.00 | 20,600 |
| Backfill | 1,587 | CY | 25.00 | 39,700 |
| Complete Pavement Restoration | 467 | SY | 50.00 | 23,400 |
| Overlay Pavement Restoration | 2,320 | SY | 20.00 | 46,400 |
| Trench Safety | 20,748 | SF | 0.50 | 10,400 |
| Spoil Load and Haul | 2,064 | CY | 10.00 | 20,600 |
| Pipe Unit Material Cost | 570 | lf | 26.00 | 14,800 |
| Pipe Installation | 570 | lf | 27.00 | 15,400 |
| Place Pipe Zone Fill | 396 | CY | 25.00 | 9,900 |
| Manholes | 2 | MH | 3,750.00 | 7,500 |
| Existing Utilities | 570 | lf | 80.00 | 45,600 |
| Dewatering | 570 | lf | 60.00 | 34,200 |

| | | | | |
|---|---|---|---|---|
| Traffic Control | 570 | lf | 10.00 | 5,700 |
| | | | Year 1999 subtotal | 294,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 342,000 |

Total: $342,000

---

## Cost Calculations for Pipe: **21" @13'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1220 ft
Conduit Type: Gravity Sewer
Depth of Cover: 13 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 16.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 3,931 | CY | 10.00 | 39,300 |
| Backfill | 2,912 | CY | 25.00 | 72,800 |
| Complete Pavement Restoration | 999 | SY | 50.00 | 50,000 |
| Overlay Pavement Restoration | 4,965 | SY | 20.00 | 99,300 |
| Trench Safety | 39,528 | SF | 0.50 | 19,800 |
| Spoil Load and Haul | 3,933 | CY | 10.00 | 39,300 |
| Pipe Unit Material Cost | 1,220 | lf | 26.00 | 31,700 |
| Pipe Installation | 1,220 | lf | 27.00 | 32,900 |
| Place Pipe Zone Fill | 848 | CY | 25.00 | 21,200 |
| Manholes | 3 | MH | 3,250.00 | 9,750 |
| Existing Utilities | 1,220 | lf | 80.00 | 97,600 |
| Dewatering | 1,220 | lf | 60.00 | 73,200 |
| Traffic Control | 1,220 | lf | 10.00 | 12,200 |
| | | | Year 1999 subtotal | 599,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 699,000 |

Total: $699,000

---

Cost Calculations for Pipe: **21" @12'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 2040 ft
Conduit Type: Gravity Sewer
Depth of Cover: 12 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 15.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 6,167 | CY | 10.00 | 61,700 |
| Backfill | 4,463 | CY | 25.00 | 112,000 |
| Complete Pavement Restoration | 1,671 | SY | 50.00 | 83,600 |
| Overlay Pavement Restoration | 8,303 | SY | 20.00 | 166,000 |

| | | | | |
|---|---|---|---|---|
| Trench Safety | 62,016 | SF | 0.50 | 31,000 |
| Spoil Load and Haul | 6,171 | CY | 10.00 | 61,700 |
| Pipe Unit Material Cost | 2,040 | lf | 26.00 | 53,000 |
| Pipe Installation | 2,040 | lf | 27.00 | 55,100 |
| Place Pipe Zone Fill | 1,418 | CY | 25.00 | 35,500 |
| Manholes | 5 | MH | 3,000.00 | 15,000 |
| Existing Utilities | 2,040 | lf | 80.00 | 163,000 |
| Dewatering | 2,040 | lf | 60.00 | 122,000 |
| Traffic Control | 2,040 | lf | 10.00 | 20,400 |
| | | | Year 1999 subtotal | 980,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 1,140,000 |

Total: $1,140,000

---

## Cost Calculations for Pipe: **21" @11'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 200 ft
Conduit Type: Gravity Sewer
Depth of Cover: 11 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)

Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 14.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 565 | CY | 10.00 | 5,650 |
| Backfill | 398 | CY | 25.00 | 9,950 |
| Complete Pavement Restoration | 164 | SY | 50.00 | 8,200 |
| Overlay Pavement Restoration | 814 | SY | 20.00 | 16,300 |
| Trench Safety | 5,680 | SF | 0.50 | 2,840 |
| Spoil Load and Haul | 565 | CY | 10.00 | 5,650 |
| Pipe Unit Material Cost | 200 | lf | 26.00 | 5,200 |
| Pipe Installation | 200 | lf | 27.00 | 5,400 |
| Place Pipe Zone Fill | 139 | CY | 25.00 | 3,480 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 200 | lf | 80.00 | 16,000 |
| Dewatering | 200 | lf | 60.00 | 12,000 |
| Traffic Control | 200 | lf | 10.00 | 2,000 |
| | | | Year 1999 subtotal | 95,700 |

Mobilization/Demobilization at 10% 1.10

| | |
|---|---|
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 111,000 |

Total: $111,000

---

## Cost Calculations for Pipe: **21" @10'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1770 ft
Conduit Type: Gravity Sewer
Depth of Cover: 10 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 13.2 ft |

Complete Surface Rest. Width 7.37 ft

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,647 | CY | 10.00 | 46,500 |
| Backfill | 3,168 | CY | 25.00 | 79,200 |
| Complete Pavement Restoration | 1,449 | SY | 50.00 | 72,500 |
| Overlay Pavement Restoration | 7,204 | SY | 20.00 | 144,000 |
| Trench Safety | 46,728 | SF | 0.50 | 23,400 |
| Spoil Load and Haul | 4,650 | CY | 10.00 | 46,500 |
| Pipe Unit Material Cost | 1,770 | lf | 26.00 | 46,000 |
| Pipe Installation | 1,770 | lf | 27.00 | 47,800 |
| Place Pipe Zone Fill | 1,231 | CY | 25.00 | 30,800 |
| Manholes | 4 | MH | 3,000.00 | 12,000 |
| Existing Utilities | 1,770 | lf | 80.00 | 142,000 |
| Dewatering | 1,770 | lf | 60.00 | 106,000 |
| Traffic Control | 1,770 | lf | 10.00 | 17,700 |
| | | | Year 1999 subtotal | 814,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 949,000 |

Total: $949,000

---

## Cost Calculations for Pipe: **21" @9'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 1650 ft
Conduit Type: Gravity Sewer
Depth of Cover: 9 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 12.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,004 | CY | 10.00 | 40,000 |
| Backfill | 2,625 | CY | 25.00 | 65,600 |
| Complete Pavement Restoration | 1,351 | SY | 50.00 | 67,600 |
| Overlay Pavement Restoration | 6,716 | SY | 20.00 | 134,000 |
| Trench Safety | 40,260 | SF | 0.50 | 20,100 |
| Spoil Load and Haul | 4,007 | CY | 10.00 | 40,100 |
| Pipe Unit Material Cost | 1,650 | lf | 26.00 | 42,900 |
| Pipe Installation | 1,650 | lf | 27.00 | 44,600 |
| Place Pipe Zone Fill | 1,147 | CY | 25.00 | 28,700 |
| Manholes | 4 | MH | 3,000.00 | 12,000 |

| | | | | |
|---|---|---|---|---|
| Existing Utilities | 1,650 | lf | 80.00 | 132,000 |
| Dewatering | 1,650 | lf | 60.00 | 99,000 |
| Traffic Control | 1,650 | lf | 10.00 | 16,500 |
| | | | Year 1999 subtotal | 743,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 866,000 |

Total: $866,000

---

## Cost Calculations for Pipe: **21" @8'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 2580 ft
Conduit Type: Gravity Sewer
Depth of Cover: 8 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None

Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 11.2 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 5,747 | CY | 10.00 | 57,500 |
| Backfill | 3,592 | CY | 25.00 | 89,800 |
| Complete Pavement Restoration | 2,113 | SY | 50.00 | 106,000 |
| Overlay Pavement Restoration | 10,501 | SY | 20.00 | 210,000 |
| Trench Safety | 57,792 | SF | 0.50 | 28,900 |
| Spoil Load and Haul | 5,752 | CY | 10.00 | 57,500 |
| Pipe Unit Material Cost | 2,580 | lf | 26.00 | 67,100 |
| Pipe Installation | 2,580 | lf | 27.00 | 69,700 |
| Place Pipe Zone Fill | 1,794 | CY | 25.00 | 44,900 |
| Manholes | 6 | MH | 3,000.00 | 18,000 |
| Existing Utilities | 2,580 | lf | 80.00 | 206,000 |
| Dewatering | 2,580 | lf | 60.00 | 155,000 |
| Traffic Control | 2,580 | lf | 10.00 | 25,800 |
| | | | Year 1999 subtotal | 1,140,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 1,330,000 |

Total: $1,330,000

## Cost Calculations for Pipe: **21" @7'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 480 ft
Conduit Type: Gravity Sewer
Depth of Cover: 7 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |
| Excavation Depth | 10.2 ft |
| Complete Surface Rest. Width | 7.37 ft |

### Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 974 | CY | 10.00 | 9,740 |
| Backfill | 573 | CY | 25.00 | 14,300 |

| | | | | |
|---|---|---|---|---|
| Complete Pavement Restoration | 393 | SY | 50.00 | 19,700 |
| Overlay Pavement Restoration | 1,954 | SY | 20.00 | 39,100 |
| Trench Safety | 9,792 | SF | 0.50 | 4,900 |
| Spoil Load and Haul | 975 | CY | 10.00 | 9,750 |
| Pipe Unit Material Cost | 480 | lf | 26.00 | 12,500 |
| Pipe Installation | 480 | lf | 27.00 | 13,000 |
| Place Pipe Zone Fill | 334 | CY | 25.00 | 8,350 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 480 | lf | 80.00 | 38,400 |
| Dewatering | 480 | lf | 60.00 | 28,800 |
| Traffic Control | 480 | lf | 10.00 | 4,800 |
| | | | Year 1999 subtotal | 206,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 241,000 |

Total: $241,000

---

## Cost Calculations for Pipe: **21" @6'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002

Length: 2130 ft

Conduit Type: Gravity Sewer

Depth of Cover: 6 ft

Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 9.21 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 3,902 | CY | 10.00 | 39,000 |
| Backfill | 2,118 | CY | 25.00 | 53,000 |
| Complete Pavement Restoration | 1,744 | SY | 50.00 | 87,200 |
| Overlay Pavement Restoration | 8,669 | SY | 20.00 | 173,000 |
| Trench Safety | 39,235 | SF | 0.50 | 19,600 |
| Spoil Load and Haul | 3,902 | CY | 10.00 | 39,000 |
| Pipe Unit Material Cost | 2,130 | lf | 26.00 | 55,400 |
| Pipe Installation | 2,130 | lf | 27.00 | 57,500 |
| Place Pipe Zone Fill | 1,481 | CY | 25.00 | 37,000 |
| Manholes | 5 | MH | 3,000.00 | 15,000 |
| Existing Utilities | 2,130 | lf | 80.00 | 170,000 |
| Dewatering | 2,130 | lf | 60.00 | 128,000 |
| Traffic Control | 2,130 | lf | 10.00 | 21,300 |
| | | | Year 1999 subtotal | 895,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 1,040,000 |

Total: $1,040,000

---

## Cost Calculations for Pipe: **21" @5'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 270 ft
Conduit Type: Gravity Sewer
Depth of Cover: 5 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

### Geometry

| | |
|---|---|
| Outer Diameter | 2.21 ft |
| Trench Width | 5.37 ft |

| | | |
|---|---|---|
| Excavation Depth | 8.21 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 441 | CY | 10.00 | 4,410 |
| Backfill | 215 | CY | 25.00 | 5,380 |
| Complete Pavement Restoration | 221 | SY | 50.00 | 11,100 |
| Overlay Pavement Restoration | 1,099 | SY | 20.00 | 22,000 |
| Trench Safety | 4,433 | SF | 0.50 | 2,220 |
| Spoil Load and Haul | 441 | CY | 10.00 | 4,410 |
| Pipe Unit Material Cost | 270 | lf | 26.00 | 7,020 |
| Pipe Installation | 270 | lf | 27.00 | 7,290 |
| Place Pipe Zone Fill | 188 | CY | 25.00 | 4,700 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 270 | lf | 80.00 | 21,600 |
| Dewatering | 270 | lf | 60.00 | 16,200 |
| Traffic Control | 270 | lf | 10.00 | 2,700 |
| | | | Year 1999 subtotal | 112,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 130,000 |

Total: $130,000

---

## Cost Calculations for Pipe: **21" @4'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT*

*include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 4165 ft
Conduit Type: Gravity Sewer
Depth of Cover: 4 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 21 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.21 | ft |
| Trench Width | 5.37 | ft |
| Excavation Depth | 7.21 | ft |
| Complete Surface Rest. Width | 7.37 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 5,973 | CY | 10.00 | 59,700 |
| Backfill | 2,485 | CY | 25.00 | 62,100 |
| Complete Pavement Restoration | 3,411 | SY | 50.00 | 171,000 |
| Overlay Pavement Restoration | 16,952 | SY | 20.00 | 339,000 |
| Trench Safety | 60,059 | SF | 0.50 | 30,000 |
| Spoil Load and Haul | 5,973 | CY | 10.00 | 59,700 |
| Pipe Unit Material Cost | 4,165 | lf | 26.00 | 108,000 |

| | | | | |
|---|---|---|---|---|
| Pipe Installation | 4,165 | lf | 27.00 | 112,000 |
| Place Pipe Zone Fill | 2,896 | CY | 25.00 | 72,400 |
| Manholes | 9 | MH | 3,000.00 | 27,000 |
| Existing Utilities | 4,165 | lf | 80.00 | 333,000 |
| Dewatering | 4,165 | lf | 60.00 | 250,000 |
| Traffic Control | 4,165 | lf | 10.00 | 41,700 |
| | | | Year 1999 subtotal | 1,670,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 1,950,000 |

Total: $1,950,000

---

## Cost Calculations for Project: **18"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Project Year: 2002

Comments:

### Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 18" @10' | Pipe | 2002 | 218,000 | 1.00 | 218,000 |
| 18" @9' | Pipe | 2002 | 509,000 | 1.00 | 509,000 |
| 18" @7' | Pipe | 2002 | 201,000 | 1.00 | 201,000 |
| 18" @6' | Pipe | 2002 | 930,000 | 1.00 | 930,000 |

| | | | | | |
|---|---|---|---|---|---|
| 18" @5' | Pipe | 2002 | 805,000 | 1.00 | 805,000 |
| 18" @4' | Pipe | 2002 | 543,000 | 1.00 | 543,000 |
| | | | | Subtotal | 3,210,000 |

Total: $3,210,000

---

## Cost Calculations for Pipe: **18" @10'**

Project year: 2002

> *The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 500 ft
Conduit Type: Gravity Sewer
Depth of Cover: 10 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 12.9 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 1,194 | CY | 10.00 | 11,900 |
| Backfill | 833 | CY | 25.00 | 20,800 |
| Complete Pavement Restoration | 389 | SY | 50.00 | 19,500 |
| Overlay Pavement Restoration | 833 | SY | 20.00 | 16,700 |
| Trench Safety | 12,900 | SF | 0.50 | 6,450 |
| Spoil Load and Haul | 1,196 | CY | 10.00 | 12,000 |
| Pipe Unit Material Cost | 500 | lf | 23.00 | 11,500 |
| Pipe Installation | 500 | lf | 25.00 | 12,500 |
| Place Pipe Zone Fill | 309 | CY | 25.00 | 7,730 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 500 | lf | 60.00 | 30,000 |
| Dewatering | 500 | lf | 60.00 | 30,000 |
| Traffic Control | 500 | lf | 10.00 | 5,000 |
| | | | Year 1999 subtotal | 187,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 218,000 |

Total: $218,000

---

## Cost Calculations for Pipe: **18" @9'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 1190 ft
Conduit Type: Gravity Sewer
Depth of Cover: 9 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 11.9 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 2,622 | CY | 10.00 | 26,200 |
| Backfill | 1,763 | CY | 25.00 | 44,100 |
| Complete Pavement Restoration | 926 | SY | 50.00 | 46,300 |
| Overlay Pavement Restoration | 1,983 | SY | 20.00 | 39,700 |
| Trench Safety | 28,322 | SF | 0.50 | 14,200 |
| Spoil Load and Haul | 2,627 | CY | 10.00 | 26,300 |
| Pipe Unit Material Cost | 1,190 | lf | 23.00 | 27,400 |
| Pipe Installation | 1,190 | lf | 25.00 | 29,800 |
| Place Pipe Zone Fill | 736 | CY | 25.00 | 18,400 |
| Manholes | 3 | MH | 3,000.00 | 9,000 |
| Existing Utilities | 1,190 | lf | 60.00 | 71,400 |

| | | | | |
|---|---|---|---|---|
| Dewatering | 1,190 | lf | 60.00 | 71,400 |
| Traffic Control | 1,190 | lf | 10.00 | 11,900 |
| | | | Year 1999 subtotal | 436,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 509,000 |

Total: $509,000

---

## Cost Calculations for Pipe: **18" @7'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 500 ft
Conduit Type: Gravity Sewer
Depth of Cover: 7 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard

Pipe Diameter: 18 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 9.92 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 919 | CY | 10.00 | 9,190 |
| Backfill | 556 | CY | 25.00 | 13,900 |
| Complete Pavement Restoration | 389 | SY | 50.00 | 19,500 |
| Overlay Pavement Restoration | 833 | SY | 20.00 | 16,700 |
| Trench Safety | 9,920 | SF | 0.50 | 4,960 |
| Spoil Load and Haul | 919 | CY | 10.00 | 9,190 |
| Pipe Unit Material Cost | 500 | lf | 23.00 | 11,500 |
| Pipe Installation | 500 | lf | 25.00 | 12,500 |
| Place Pipe Zone Fill | 309 | CY | 25.00 | 7,730 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 500 | lf | 60.00 | 30,000 |
| Dewatering | 500 | lf | 60.00 | 30,000 |
| Traffic Control | 500 | lf | 10.00 | 5,000 |
| | | | Year 1999 subtotal | 173,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 201,000 |

Total: $201,000

## Cost Calculations for Pipe: **18" @6'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 2360 ft
Conduit Type: Gravity Sewer
Depth of Cover: 6 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 8.92 | ft |
| Complete Surface Rest. Width | 7 | ft |

### Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 3,898 | CY | 10.00 | 39,000 |
| Backfill | 2,185 | CY | 25.00 | 54,600 |
| Complete Pavement Restoration | 1,836 | SY | 50.00 | 91,800 |

| | | | | |
|---|---|---|---|---|
| Overlay Pavement Restoration | 3,933 | SY | 20.00 | 78,700 |
| Trench Safety | 42,102 | SF | 0.50 | 21,100 |
| Spoil Load and Haul | 3,898 | CY | 10.00 | 39,000 |
| Pipe Unit Material Cost | 2,360 | lf | 23.00 | 54,300 |
| Pipe Installation | 2,360 | lf | 25.00 | 59,000 |
| Place Pipe Zone Fill | 1,460 | CY | 25.00 | 36,500 |
| Manholes | 5 | MH | 3,000.00 | 15,000 |
| Existing Utilities | 2,360 | lf | 60.00 | 142,000 |
| Dewatering | 2,360 | lf | 60.00 | 142,000 |
| Traffic Control | 2,360 | lf | 10.00 | 23,600 |
| | | | Year 1999 subtotal | 797,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 930,000 |

Total: $930,000

---

## Cost Calculations for Pipe: **18" @5'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 2100 ft
Conduit Type: Gravity Sewer
Depth of Cover: 5 ft
Trench Backfill Type: Imported

Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |
| Excavation Depth | 7.92 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 3,080 | CY | 10.00 | 30,800 |
| Backfill | 1,556 | CY | 25.00 | 38,900 |
| Complete Pavement Restoration | 1,633 | SY | 50.00 | 81,700 |
| Overlay Pavement Restoration | 3,500 | SY | 20.00 | 70,000 |
| Trench Safety | 33,264 | SF | 0.50 | 16,600 |
| Spoil Load and Haul | 3,080 | CY | 10.00 | 30,800 |
| Pipe Unit Material Cost | 2,100 | lf | 23.00 | 48,300 |
| Pipe Installation | 2,100 | lf | 25.00 | 52,500 |
| Place Pipe Zone Fill | 1,299 | CY | 25.00 | 32,500 |
| Manholes | 5 | MH | 3,000.00 | 15,000 |
| Existing Utilities | 2,100 | lf | 60.00 | 126,000 |
| Dewatering | 2,100 | lf | 60.00 | 126,000 |
| Traffic Control | 2,100 | lf | 10.00 | 21,000 |
| | | | Year 1999 subtotal | 690,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 805,000 |

Total: $805,000

---

## Cost Calculations for Pipe: **18" @4'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1460 ft
Conduit Type: Gravity Sewer
Depth of Cover: 4 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 18 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.92 | ft |
| Trench Width | 5 | ft |

| | | |
|---|---|---|
| Excavation Depth | 6.92 | ft |
| Complete Surface Rest. Width | 7 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 1,871 | CY | 10.00 | 18,700 |
| Backfill | 811 | CY | 25.00 | 20,300 |
| Complete Pavement Restoration | 1,136 | SY | 50.00 | 56,800 |
| Overlay Pavement Restoration | 2,433 | SY | 20.00 | 48,700 |
| Trench Safety | 20,206 | SF | 0.50 | 10,100 |
| Spoil Load and Haul | 1,871 | CY | 10.00 | 18,700 |
| Pipe Unit Material Cost | 1,460 | lf | 23.00 | 33,600 |
| Pipe Installation | 1,460 | lf | 25.00 | 36,500 |
| Place Pipe Zone Fill | 903 | CY | 25.00 | 22,600 |
| Manholes | 3 | MH | 3,000.00 | 9,000 |
| Existing Utilities | 1,460 | lf | 60.00 | 87,600 |
| Dewatering | 1,460 | lf | 60.00 | 87,600 |
| Traffic Control | 1,460 | lf | 10.00 | 14,600 |
| | | | Year 1999 subtotal | 465,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 543,000 |

Total: $543,000

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## Cost Calculations for Project: **15"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT*

*include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Project Year: 2002

Comments:

Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 15" @11' | Pipe | 2002 | 386,000 | 1.00 | 386,000 |
| | | | | Subtotal | 386,000 |

Total: $386,000

---

## Cost Calculations for Pipe: **15" @11'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002

Length: 800 ft

Conduit Type: Gravity Sewer

Depth of Cover: 11 ft

Trench Backfill Type: Imported

Manhole Spacing: Average (500 ft)

Existing Utilities: Complex

Dewatering: Significant

Pavement Restoration: Full Width - Arterial (44 ft)

Traffic: Heavy

Land Acquisition: None

Required Easements: None

Trench Safety: Standard
Pipe Diameter: 15 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.67 | ft |
| Trench Width | 4.67 | ft |
| Excavation Depth | 13.7 | ft |
| Complete Surface Rest. Width | 6.67 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 1,896 | CY | 10.00 | 19,000 |
| Backfill | 1,384 | CY | 25.00 | 34,600 |
| Complete Pavement Restoration | 593 | SY | 50.00 | 29,700 |
| Overlay Pavement Restoration | 3,318 | SY | 20.00 | 66,400 |
| Trench Safety | 21,920 | SF | 0.50 | 11,000 |
| Spoil Load and Haul | 1,892 | CY | 10.00 | 18,900 |
| Pipe Unit Material Cost | 800 | lf | 18.00 | 14,400 |
| Pipe Installation | 800 | lf | 20.00 | 16,000 |
| Place Pipe Zone Fill | 443 | CY | 25.00 | 11,100 |
| Manholes | 2 | MH | 3,000.00 | 6,000 |
| Existing Utilities | 800 | lf | 60.00 | 48,000 |
| Dewatering | 800 | lf | 60.00 | 48,000 |
| Traffic Control | 800 | lf | 10.00 | 8,000 |
| | | | Year 1999 subtotal | 331,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 386,000 |

Total: $386,000

## Cost Calculations for Project: **12"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Project Year: 2002

Comments:

Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 12" @7' | Pipe | 2002 | 121,000 | 1.00 | 121,000 |
| 12" @4' | Pipe | 2002 | 24,500 | 1.00 | 24,500 |
| | | | | Subtotal | 146,000 |

Total: $146,000

---

## Cost Calculations for Pipe: **12" @7'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002

Length: 310 ft

Conduit Type: Gravity Sewer

Depth of Cover: 7 ft

Trench Backfill Type: Imported

Manhole Spacing: Average (500 ft)

Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 12 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.42 | ft |
| Trench Width | 4.35 | ft |
| Excavation Depth | 9.42 | ft |
| Complete Surface Rest. Width | 6.35 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 470 | CY | 10.00 | 4,700 |
| Backfill | 300 | CY | 25.00 | 7,500 |
| Complete Pavement Restoration | 219 | SY | 50.00 | 11,000 |
| Overlay Pavement Restoration | 1,297 | SY | 20.00 | 25,900 |
| Trench Safety | 5,840 | SF | 0.50 | 2,920 |
| Spoil Load and Haul | 470 | CY | 10.00 | 4,700 |
| Pipe Unit Material Cost | 310 | lf | 15.00 | 4,650 |
| Pipe Installation | 310 | lf | 15.00 | 4,650 |
| Place Pipe Zone Fill | 153 | CY | 25.00 | 3,830 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 310 | lf | 40.00 | 12,400 |
| Dewatering | 310 | lf | 50.00 | 15,500 |
| Traffic Control | 310 | lf | 10.00 | 3,100 |
| | | | Year 1999 subtotal | 104,000 |

Mobilization/Demobilization at 10% 1.10

| | |
|---|---|
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 121,000 |

Total: $121,000

---

## Cost Calculations for Pipe: **12" @4'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 60 ft
Conduit Type: Gravity Sewer
Depth of Cover: 4 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 12 in.

### Geometry

| | |
|---|---|
| Outer Diameter | 1.42 ft |
| Trench Width | 4.35 ft |
| Excavation Depth | 6.42 ft |

Complete Surface Rest. Width 6.35 ft

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 62 | CY | 10.00 | 620 |
| Backfill | 29 | CY | 25.00 | 725 |
| Complete Pavement Restoration | 42 | SY | 50.00 | 2,100 |
| Overlay Pavement Restoration | 251 | SY | 20.00 | 5,020 |
| Trench Safety | 770 | SF | 0.50 | 385 |
| Spoil Load and Haul | 62 | CY | 10.00 | 620 |
| Pipe Unit Material Cost | 60 | lf | 15.00 | 900 |
| Pipe Installation | 60 | lf | 15.00 | 900 |
| Place Pipe Zone Fill | 30 | CY | 25.00 | 750 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 60 | lf | 40.00 | 2,400 |
| Dewatering | 60 | lf | 50.00 | 3,000 |
| Traffic Control | 60 | lf | 10.00 | 600 |
| | | Year 1999 subtotal | | 21,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 24,500 |

Total: $24,500

---

## Cost Calculations for Project: **10"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Project Year: 2002
Comments:

Sub Items

| Name | Type | Year | Cost | Multiplier | 2002 Cost |
|---|---|---|---|---|---|
| 10" @7' | Pipe | 2002 | 114,000 | 1.00 | 114,000 |
| 10" @4' | Pipe | 2002 | 23,400 | 1.00 | 23,400 |
| | | | | Subtotal | 137,000 |

Total: $137,000

---

## Cost Calculations for Pipe: **10" @7'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 310 ft
Conduit Type: Gravity Sewer
Depth of Cover: 7 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard

Pipe Diameter: 10 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.04 | ft |
| Trench Width | 3.85 | ft |
| Excavation Depth | 9.04 | ft |
| Complete Surface Rest. Width | 5.85 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 400 | CY | 10.00 | 4,000 |
| Backfill | 265 | CY | 25.00 | 6,630 |
| Complete Pavement Restoration | 202 | SY | 50.00 | 10,100 |
| Overlay Pavement Restoration | 1,314 | SY | 20.00 | 26,300 |
| Trench Safety | 5,605 | SF | 0.50 | 2,800 |
| Spoil Load and Haul | 400 | CY | 10.00 | 4,000 |
| Pipe Unit Material Cost | 310 | lf | 12.00 | 3,720 |
| Pipe Installation | 310 | lf | 12.00 | 3,720 |
| Place Pipe Zone Fill | 125 | CY | 25.00 | 3,130 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 310 | lf | 40.00 | 12,400 |
| Dewatering | 310 | lf | 50.00 | 15,500 |
| Traffic Control | 310 | lf | 10.00 | 3,100 |
| | | | Year 1999 subtotal | 98,400 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 114,000 |

Total: $114,000

## Cost Calculations for Pipe: **10" @4'**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 60 ft
Conduit Type: Gravity Sewer
Depth of Cover: 4 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 10 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 1.04 | ft |
| Trench Width | 3.85 | ft |
| Excavation Depth | 6.04 | ft |
| Complete Surface Rest. Width | 5.85 | ft |

### Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 52 | CY | 10.00 | 520 |
| Backfill | 26 | CY | 25.00 | 650 |
| Complete Pavement Restoration | 39 | SY | 50.00 | 1,950 |

| | | | | |
|---|---|---|---|---|
| Overlay Pavement Restoration | 254 | SY | 20.00 | 5,080 |
| Trench Safety | 725 | SF | 0.50 | 363 |
| Spoil Load and Haul | 52 | CY | 10.00 | 520 |
| Pipe Unit Material Cost | 60 | lf | 12.00 | 720 |
| Pipe Installation | 60 | lf | 12.00 | 720 |
| Place Pipe Zone Fill | 24 | CY | 25.00 | 600 |
| Manholes | 1 | MH | 3,000.00 | 3,000 |
| Existing Utilities | 60 | lf | 40.00 | 2,400 |
| Dewatering | 60 | lf | 50.00 | 3,000 |
| Traffic Control | 60 | lf | 10.00 | 600 |
| | | Year 1999 subtotal | | 20,100 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 23,400 |

Total: $23,400

---

## Cost Calculations for Pump Station: **LS 11**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ). Unless added as an Additional Costs item in the estimate, this cost does NOT include land acquisition costs.*

### Assumptions

Construction Year: 2002

Firm Capacity: 14.1 mgd

Total Dynamic Head: 34 ft

Excavation Depth: 30 ft

Calculated Parameters

| | | |
|---|---|---|
| Required Pump Power | 165 | Hp |
| Base Architectural/Structural Unit Cost | 121,000 | $/mgd |
| Architectural/Structural Unit Cost Adjustment | -1,430 | $/mgd |
| Base Mechanical Unit Cost | 106,000 | $/mgd |
| Mechanical Unit Cost Adjustment | -35,800 | $/mgd |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Site/Civil | 1 | LS | 367,000 | 367,000 |
| Electrical/Instrumentation | 1 | LS | 562,000 | 562,000 |
| Architectural/Structural | 14 | mgd | 120,000 | 1,680,000 |
| Mechanical | 14 | mgd | 70,200 | 983,000 |
| | | Year 1999 subtotal | | 3,590,000 |

| | |
|---|---|
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.06 |
| Subtotal | 3,810,000 |

Total: $3,810,000

---

## Cost Calculations for Pipe: **FM LS11**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002

Length: 2000 ft

Conduit Type: Force Main
Depth of Cover: 6 ft
Trench Backfill Type: Imported
Manhole Spacing: None
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 24 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.15 | ft |
| Trench Width | 5.3 | ft |
| Excavation Depth | 9.15 | ft |
| Complete Surface Rest. Width | 7.3 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 3,592 | CY | 10.00 | 35,900 |
| Backfill | 1,963 | CY | 25.00 | 49,100 |
| Complete Pavement Restoration | 1,622 | SY | 50.00 | 81,100 |
| Overlay Pavement Restoration | 3,267 | SY | 20.00 | 65,300 |
| Trench Safety | 36,600 | SF | 0.50 | 18,300 |
| Spoil Load and Haul | 3,592 | CY | 10.00 | 35,900 |
| Pipe Unit Material Cost | 2,000 | lf | 43.00 | 86,000 |
| Pipe Installation | 2,000 | lf | 30.00 | 60,000 |
| Place Pipe Zone Fill | 1,360 | CY | 25.00 | 34,000 |
| Existing Utilities | 2,000 | lf | 80.00 | 160,000 |
| Dewatering | 2,000 | lf | 70.00 | 140,000 |
| Traffic Control | 2,000 | lf | 20.00 | 40,000 |
| | | | Year 1999 subtotal | 806,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 940,000 |

Total: $940,000

---

## Cost Calculations for Project: **SR18 w/o LS11 Microtunnel**

Project year: 2001

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Project Year: 2001

Comments:

### Sub Items

| Name | Type | Year | Cost | Multiplier | 2001 Cost |
|---|---|---|---|---|---|
| 24" | Pipe | 2002 | 394,000 | 0.97 | 382,000 |
| Microtunnel SR18 | Microtunnel | 2002 | 8,230,000 | 0.97 | 7,970,000 |
| 42" | Pipe | 2002 | 1,590,000 | 0.97 | 1,540,000 |
| 27 | Pipe | 2002 | 899,000 | 0.97 | 871,000 |
| | | | | Subtotal | 10,800,000 |

Total: $10,800,000

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## Cost Calculations for Pipe: **24"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 625 ft
Conduit Type: Gravity Sewer
Depth of Cover: 13 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 24 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.5 | ft |
| Trench Width | 5.75 | ft |
| Excavation Depth | 16.5 | ft |
| Complete Surface Rest. Width | 7.75 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 2,196 | CY | 10.00 | 22,000 |
| Backfill | 1,597 | CY | 25.00 | 39,900 |
| Complete Pavement Restoration | 538 | SY | 50.00 | 26,900 |
| Overlay Pavement Restoration | 2,517 | SY | 20.00 | 50,300 |
| Trench Safety | 20,625 | SF | 0.50 | 10,300 |
| Spoil Load and Haul | 2,196 | CY | 10.00 | 22,000 |

| | | | | |
|---|---|---|---|---|
| Pipe Unit Material Cost | 625 | lf | 30.00 | 18,800 |
| Pipe Installation | 625 | lf | 30.00 | 18,800 |
| Place Pipe Zone Fill | 485 | CY | 25.00 | 12,100 |
| Manholes | 2 | MH | 5,300.00 | 10,600 |
| Existing Utilities | 625 | lf | 80.00 | 50,000 |
| Dewatering | 625 | lf | 70.00 | 43,800 |
| Traffic Control | 625 | lf | 20.00 | 12,500 |
| | | | Year 1999 subtotal | 338,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 394,000 |

Total: $394,000

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## Cost Calculations for Microtunnel: **Microtunnel SR18**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ). Unless added as an Additional Costs item in the estimate, this cost does NOT include land acquisition costs.*

### Assumptions

Construction Year: 2002

Inside Diameter: 42 in.

Length: 6120 ft

Dewatering: Significant

Launch Shaft Existing Utilities: Average

Launch Shaft Excavation Depth: 25 ft

Launch Shaft Surface Restoration: Pavement

Retrieval Shaft Excavation Depth: 25 ft
Retrieval Shaft Surface Restoration: Pavement
Retrieval Shaft Existing Utilities: Average
Tunnel Easement Length: 0 ft
Easement Type: None
Traffic: Heavy
Casing Required: false
Number of Intermediate Shafts: 1
Intermediate Shaft Existing Utilities: Complex
Intermediate Shaft Excavation Depth: 38 ft
Intermediate Shaft Surface Restoration: Pavement

Tunnel Geometry

| | | |
|---|---|---|
| Outer Diameter | 4.25 | ft |
| Spoils Volume | 3,220 | CY |
| Casing Pipe Diameter | N/A | in |

Launch Shaft Geometry

| | | |
|---|---|---|
| Width | 19 | ft |
| Length | 32 | ft |
| Footprint | 608 | SF |
| Volume | 563 | CY |
| Easement Footprint | 5,660 | SF |

Retrieval Shaft Geometry

| | | |
|---|---|---|
| Width | 23 | ft |
| Length | 23 | ft |
| Footprint | 529 | SF |
| Volume | 490 | CY |
| Easement Footprint | 5,330 | SF |

Miscellaneous

| | | |
|---|---|---|
| Spoils Loads | 322 | loads |

Intermediate Shaft Geometry

| | | |
|---|---|---|
| Width | 19 | ft |
| Length | 32 | ft |
| Footprint | 608 | SF |
| Volume | 563 | CY |
| Easement Footprint | 5,660 | SF |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Spoils Haul | 3,220 | CY | 25.0 | 80,500 |
| Launch Shaft Excavation | 563 | CY | 25.0 | 14,100 |
| Launch Shaft Shoring | 2,550 | SF | 49.0 | 125,000 |
| Launch Shaft Existing Utilities | 608 | SF | 6.0 | 3,650 |
| Launch Shaft Backfill | 563 | CY | 25.0 | 14,100 |
| Launch Shaft Surface Restoration | 68 | SY | 50.0 | 3,400 |
| Retrieval Shaft Excavation | 490 | CY | 25.0 | 12,300 |
| Retrieval Shaft Shoring | 2,300 | SF | 49.0 | 113,000 |
| Retrieval Shaft Existing Utilities | 529 | SF | 6.0 | 3,170 |
| Retrieval Shaft Backfill | 490 | CY | 25.0 | 12,300 |
| Retrieval Shaft Surface Restoration | 59 | SY | 50.0 | 2,950 |
| Intermediate Shaft Excavation | 563 | CY | 25.0 | 14,100 |
| Intermediate Shaft Shoring | 3,876 | SF | 69.8 | 271,000 |
| Intermediate Shaft Existing Utilities | 608 | SF | 10.0 | 6,080 |
| Intermediate Shaft Backfill | 563 | CY | 25.0 | 14,100 |
| Intermediate Shaft Surface Restoration | 68 | SY | 50.0 | 3,400 |
| MTBM Fixed Costs | 1 | LS | 300,000.0 | 300,000 |
| Microtunnel Boring | 6,120 | ft | 966.0 | 5,910,000 |
| Tunnel Dewatering | 1 | LS | 70,000.0 | 70,000 |
| Traffic Control | 3 | shaft | 25,000.0 | 75,000 |
| | | | Year 1999 subtotal | 7,050,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |

| | |
|---|---|
| Effective Multiplier | 1.17 |
| Subtotal | 8,230,000 |

Total: $8,230,000

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## Cost Calculations for Pipe: **42"**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

### Assumptions

Construction Year: 2002
Length: 1770 ft
Conduit Type: Gravity Sewer
Depth of Cover: 18 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Half Width - Arterial (22 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 42 in.

### Geometry

| | | |
|---|---|---|
| Outer Diameter | 4.25 | ft |
| Trench Width | 8.03 | ft |
| Excavation Depth | 23.3 | ft |
| Complete Surface Rest. Width | 10 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 12,265 | CY | 10.00 | 123,000 |
| Backfill | 8,949 | CY | 25.00 | 224,000 |
| Complete Pavement Restoration | 1,967 | SY | 50.00 | 98,400 |
| Overlay Pavement Restoration | 2,360 | SY | 20.00 | 47,200 |
| Trench Safety | 82,482 | SF | 0.50 | 41,200 |
| Spoil Load and Haul | 12,239 | CY | 10.00 | 122,000 |
| Pipe Unit Material Cost | 1,770 | lf | 78.00 | 138,000 |
| Pipe Installation | 1,770 | lf | 60.00 | 106,000 |
| Place Pipe Zone Fill | 2,360 | CY | 25.00 | 59,000 |
| Manholes | 4 | MH | 12,000.00 | 48,000 |
| Existing Utilities | 1,770 | lf | 100.00 | 177,000 |
| Dewatering | 1,770 | lf | 80.00 | 142,000 |
| Traffic Control | 1,770 | lf | 20.00 | 35,400 |
| | | | Year 1999 subtotal | 1,360,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| | |
| Subtotal | 1,590,000 |

Total: $1,590,000

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## Cost Calculations for Pipe: **27**

Project year: 2002

*The estimated construction cost below, which includes contractor overhead and profit, is for planning purposes only. The output does NOT include contingency, sales tax, or allied costs (design, permitting, construction management, etc. ).*

Assumptions

Construction Year: 2002
Length: 1500 ft
Conduit Type: Gravity Sewer
Depth of Cover: 9 ft
Trench Backfill Type: Imported
Manhole Spacing: Average (500 ft)
Existing Utilities: Complex
Dewatering: Significant
Pavement Restoration: Full Width - Arterial (44 ft)
Traffic: Heavy
Land Acquisition: None
Required Easements: None
Trench Safety: Standard
Pipe Diameter: 27 in.

Geometry

| | | |
|---|---|---|
| Outer Diameter | 2.79 | ft |
| Trench Width | 6.13 | ft |
| Excavation Depth | 12.8 | ft |
| Complete Surface Rest. Width | 8.13 | ft |

Unit Costs (Basis 1999)

| Item | Quantity | Unit | Unit Cost | ItemCost |
|---|---|---|---|---|
| Excavation | 4,359 | CY | 10.00 | 43,600 |
| Backfill | 2,724 | CY | 25.00 | 68,100 |
| Complete Pavement Restoration | 1,355 | SY | 50.00 | 67,800 |
| Overlay Pavement Restoration | 5,978 | SY | 20.00 | 120,000 |
| Trench Safety | 38,400 | SF | 0.50 | 19,200 |
| Spoil Load and Haul | 4,356 | CY | 10.00 | 43,600 |
| Pipe Unit Material Cost | 1,500 | lf | 36.00 | 54,000 |
| Pipe Installation | 1,500 | lf | 35.00 | 52,500 |
| Place Pipe Zone Fill | 1,292 | CY | 25.00 | 32,300 |
| Manholes | 3 | MH | 5,000.00 | 15,000 |
| Existing Utilities | 1,500 | lf | 80.00 | 120,000 |

| | | | | |
|---|---|---|---|---|
| Dewatering | 1,500 | lf | 70.00 | 105,000 |
| Traffic Control | 1,500 | lf | 20.00 | 30,000 |
| | | | Year 1999 subtotal | 771,000 |

| | |
|---|---|
| Mobilization/Demobilization at 10% | 1.10 |
| Multiplier from ENRCCI 7137 (1999) to 7560 (2002) | 1.06 |
| Effective Multiplier | 1.17 |
| Subtotal | 899,000 |

Total: $899,000